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BRUSHRESOURCES

A Brush Engineered Materials Inc. Company

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August 22, 2005

Mr. Daron Haddock
Permit Supervisor, Minerals Regulatory Program
Utah Division of Oil Gas and Mining
1594 West North Temple, Suite 1210
Salt Lake City, Utah 84114

RE: Response to Division Comments – Topaz Mining Property MRP Amendment Proposal, Brush Resources, Inc., M/023/003, Juab County, Utah

Dear Mr. Haddock:

Attached please find the modified version of the Amended Mining and Reclamation Plan (MRP) for the Topaz Mining Property. The attached version is printed in edit mode showing all additions to and deletions from the initial version submitted to the Division on December 15, 2004. We have responded to all of the Division's Initial Review comments that accompanied your letter of January 25, 2005. Most of the changes in the MRP are in response to those comments. Some other changes have been made as a result of minor modifications to the plan that were initiated by BRI. We have also prepared a Comment Response Summary. That document, which also accompanies this letter, comprises individual responses or comments to each of the Division's January 25, 2005 comments. The responses are presented in the same order as were the Division's comments.

The redlined version of the MRP and the Comment Response Summary should enable Division staff to efficiently review the changes made to the MRP and to better understand Brush Resources, Inc.'s (BRI) intentions and objectives in preparing this amended MRP.

BRI appreciates the Division's thorough review of the amended MRP as well as its patience while BRI and its consultant re-evaluated our mining and reclamation approach in light of Division comments and our own plan changes.

versions

Sincerely,

Alex Boulton
President

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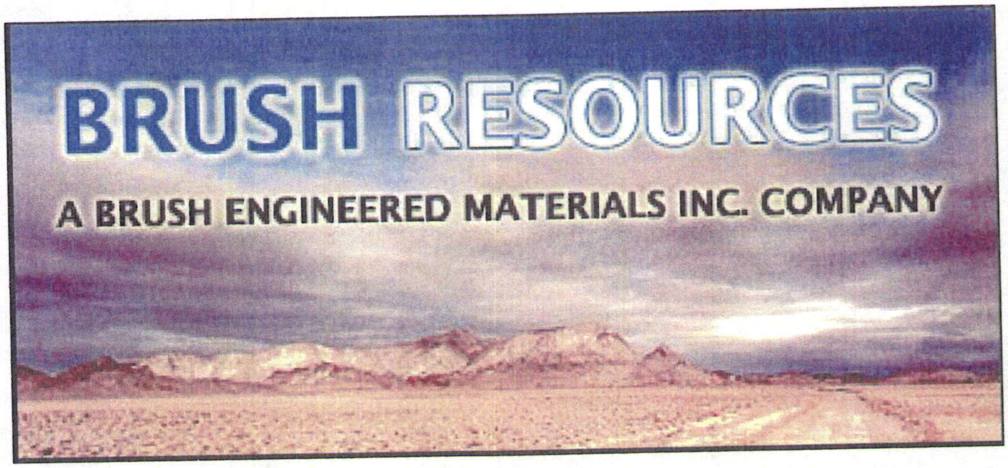
DIV. OF OIL, GAS & MINING



MINING AND RECLAMATION PLAN

VOLUME 1 OF 2

Prepared For:

Brush Resources, Inc.
P.O. Box 815
Delta, UT 84624

Prepared By:

JBR Environmental Consultants, Inc.
8160 South Highland Drive
Sandy, Utah 84093

NOVEMBER 2004

TABLE OF CONTENTS

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LIST OF TABLES

Deleted: EXECUTIVE SUMMARY 61¶ 1.0 MINING AND PERMITTING BACKGROUND 98¶ 2.0 INTRODUCTION 131211¶ 2.1 Location and Access 1413¶ 2.2 Surface and Mineral Ownership 151413¶ 3.0 SITE DESCRIPTION 171615¶ 3.1 Mineral Deposits and Geology 171615¶ 3.2 Climate 181716¶ 3.3 Air Quality 181716¶ 3.4 Land Use 191817¶ 3.5 Surface Water Hydrology 191817¶ 3.6 Ground Water Hydrology 212019¶ 3.7 Soils 222120¶ *3.7.1 Alluvial Soils 232221¶ 3.7.2 Rhyolite/latite-derived Soils 242321¶ 3.7.3 Tuff-derived Soils 242322¶ 3.7.4 Limestone-derived Soils 252322¶* 3.8 Vegetation 252422¶ 3.9 Wildlife 252423¶ 3.10 Archeological & Paleontological Resources 262523¶ 3.11 Public Access and Safety 272624¶ 4.0 EXISTING MINE OPERATIONS 282725¶ 4.1 Mining Methods 282725¶ 4.2 Pit Complexes 292826¶ 4.3 Mining Sequence 302927¶ *4.3.1 Development Drilling 302927¶ 4.3.2 Geologic Modeling 302927¶ 4.3.3 Economic Analysis 312* ... [1]

Deleted: Table 2.2-1 Topaz Mining Properties Legal Description 161514 Table 2.2-2 Topaz Mine Royalty Interest Holders 161514¶ Table 4.2-1 Open Pits Completed, in Progress or Approved 292826¶ Table 5.1-1 Proposed Phase 1 "Logical Mining Units" Disturbed Areas 373835¶ Table 5.1-2 Proposed Ultimate Mine Development Disturbed Areas 383835¶ Table 5.6-1 Estimated Salvageable Soil Volumes – Initial LMUs 434340¶ Table 5.6-2 Estimated Salvageable Soil Volumes – Ultimate Mine Development 444340¶ Table 7.9-1 Topsoil Demand 686864¶ Table 7.10-1 Reclamation Seed Mix and Application Rate 697065¶ Table 7.10-2 Soil Amendments and Application Rates 707066¶ Table 7.11-1 Reclamation Treatments Explanation Matrix **Error! Bookmark not defined.**7267¶ Table 9.1-1 Current (end 2004) Outstanding Unreclaimed Areas 807974¶

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APPENDICES

LIST OF FIGURES & PLATES
(Volume 2 of 2)

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EXECUTIVE SUMMARY

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Brush Resources Inc. (formerly Brush Wellman, Inc. and hereafter referred to as the Company) has operated open pit beryllium mines in western Juab County, Utah since 1968. In accordance with the Utah Mined Land Reclamation Act of 1975, the Company filed a Notice of Intent and Mining and Reclamation Plan (MRP) with the Utah Division of Oil Gas and Mining (Division) in 1977 and a revised MRP in 1981. The MRP revision called for the use of volcanic tuff as a cover and revegetative medium for coarse rhyolite waste rock dumps as well as revegetative test plots to assess the effectiveness of the tuff in supporting vegetative growth. The MRP remained in a state of tentative approval pending assessment of test plots and revegetation success until 1985 when the Division asked the Company to finalize the MRP.

In 1985, the Company engaged consultants to assess the success of the revegetation effort and to determine if changes to the reclamation approach were needed. Based upon the consultants' work, the Company and the Division concluded that the tuff was too saline to support vegetative growth and that the areas reclaimed using tuff would be released from revegetation requirements by variance. As a result, an alternate reclamation plan and approach was required. The Company submitted a revised Reclamation Plan in 1988. In 1989, the Division approved this plan and related surety. Included with this approval were variances for pit backfilling, dump slope regrading, and topsoil placement. The anticipated end of mine life at that time was 2037.

The MRP was subsequently amended twice; once in 1996 and again in 1999. Changes in the anticipated approach to mining resulting from improved understanding of metallurgical properties of the ore began to be contemplated in 2000 and the 1999 amendments were never implemented. This new approach to mining evolved as the result of two primary factors: expanded and better-defined ore reserves and understanding of ore quality variability made possible by extensive development drilling and the availability of sophisticated mine-planning software; and an improved understanding of process metallurgy and resultant demand for mill feed with variable chemical properties. This new outlook demands greater flexibility in mining methods and schedules to accommodate mill demands, which would result in greater future disturbance areas resulting from the expanded ore reserves.

This new mining approach calls for developing individual, well-delineated ore bodies in small, discrete increments called logical mining units (LMUs) with multiple incremental developments from different pits occurring at any given time during a specified mining phase. Mining of the entire property would occur in phases with each phase consisting of development of one or more LMUs from each of several ore bodies. The life of any mining phase is currently estimated to be 10 to 15 years. While Phase I of the proposed mining activity has been planned in detail; only generalized planning for subsequent phases or development sequences has taken place; however, currently anticipated ultimate mine development has been assessed and described.

The Topaz Mining Properties are located approximately 47 miles west-northwest of Delta in Juab County, Utah. The Company owns the entire land surface in the mine area outright, as a result of the Utah West Desert Land Exchange of 2000 and a subsequent agreement between the Company and the Utah School and Institutional Trust Lands Administration (TLA). The land area owned by the company is a contiguous block of approximately 11.6 square miles. The mineral rights (with the exception of oil and gas) are owned by the Company on all of the lands except the TLA lands, Sections 16, 32, and 36. The Company leases the beryllium resources on the TLA lands. Certain former mineral claim owners are entitled to royalties paid by Brush Wellman as part of legacy agreements that remain in effect.

The beryllium ore occurs in volcanic tuff deposits of Tertiary age and results from circulation of mineralizing solutions in normal faults and in porous tuff beds. Alteration of the tuff to various clay minerals is widespread; the hydrous beryllium silicate known as bertrandite is the ore mineral. Bertrandite occurs both as disseminations in the tuff layers and in more concentrated amounts in fluorite nodules within the mineralized tuff. As a result, the ore bodies are tabular in form. This geometry and the relatively shallow depth of many of the known deposits have enabled the Company to mine the ore bodies in discrete open pits. Overburden typically consists primarily of rhyolite with lesser amounts of tuff and alluvium.

Besides mining, current area land uses are livestock grazing and wildlife habitat. These uses were and will be the pre- and post-mining land uses for the Topaz Mining Properties.

The mine is located on the upper alluvial fans and low foothills of the west flank of Spor Mountain. Elevations at the mine range from 4400 to 5300 feet. Precipitation is low, ranging from 6 to 8 inches annually and most of it occurs as spring and summer rain; snowfall accumulation is minimal. The annual evaporation rate, at 77 inches per year, is nearly 10 times the annual precipitation rate. The foregoing factors dictate the natural surface water conditions in the mine area. All stream channels are ephemeral and originally drained to the alluvial fans where most runoff infiltrates. Mine dump construction has impounded a number of the drainages in the mine area. Following rapid precipitation and runoff, water can be impounded for brief periods of time behind these dumps. Such impounded water infiltrates rapidly and the dumps are of such large size relative to the volume of impounded water that overtopping or adverse impacts on the dumps' retention capacities from erosion do not occur. Open pits tend to accumulate standing water derived from precipitation. Because evaporation in the pits is reduced, standing water can be present up to year-round in some pits. This water plus the intermittent, short-term accumulations behind waste rock dumps has provided water for livestock and wildlife and resulted in enhanced habitat for wildlife in the immediate mine vicinity. As a result, populations of some wildlife species, such as antelope and chukkar partridge, have been enhanced.

The clay-rich tuff deposits that host the ore deposits also underlie the ore bodies and form the bottoms of the open pits; therefore water that drains into the pits does not infiltrate and is not released to ground water. The open pits in the ore deposits mined to date and those to be mined in the future as part of this proposed MRP revision have not and will not reach the water table. The rhyolite and alluvium that make up the vast majority of waste rock are neither acid generating nor sources of otherwise leachable metals or salts. The tuff component of waste rock is isolated either as pit backfill or within rhyolite cover in waste rock dumps. As a result, impacts to ground water from mining operations are believed to be insignificant. The potential effects upon ground water from the Company's mining operations have been demonstrated to be *de minimus* under the Utah Ground Water Quality Protections Rules and the mining operation has been determined by the Utah Division of Water Quality to be permitted by rule.

The Company has been salvaging topsoil for use in revegetation since 1989. Salvageable soils and soil-substitute materials have been and will be recovered prior to overburden lifting and stockpiled for later use. True topsoil in the mine area is thin and poorly developed. Soils and alluvium beneath the topsoil layer are often saline and unsuitable for use as revegetation media. Soils derived from the tuff deposits and the tuff-derived soils are highly saline and do not support vegetative growth. Soil materials that are unsuitable as growth media because of their chemical characteristics will no longer be salvaged.

Topsoil testing, vegetation test plots, and evaluation of revegetative success that have been carried out in the past have provided some useful information regarding suitability of the soils in the area as revegetation media and the benefits of various soil amendments; however, the Company has determined that a more systematic program of topsoil evaluation and revegetation success is desirable and is in the process of developing this program.

A Division-approved seed mix consisting of native vegetation is used for re-seeding. Revegetative success in past reclamation efforts has been directly related to the salinity of the soil or growth medium used and the amount of precipitation in the growing seasons following re-seeding. A number of individual soil-amendment types and combinations have been used in the past to aid in re-establishment of vegetative cover. Observations on the relationships of revegetative success to the application of various soil amendment types have not demonstrated that any single type or combination of soil amendments either consistently enhance revegetation or are preferable over other types or combinations. The Company will continue to evaluate the effectiveness and cost-benefit of soil amendments.

In the past, mining at the Topaz Mining properties has been accomplished using a combination of Company mine staff and excavation contractors to develop and operate two separate open pits – one a high-grade pit and the other a low-grade pit. Stockpiled ore from each pit was blended as necessary and shipped to the Company's mill located just north of Delta in Millard County. Contractors conducted pre-stripping operations removing all but the overburden tuff that immediately overlies the ore horizons. Drilling and blasting was also contracted. Company mine staff then used dozers, hydraulic excavators and scrapers to remove the remaining waste rock and to mine the ore. Ore was hauled to the stockpiles with scrapers and loaded into contractor-provided over-the-road belly dump trucks for transport to the mill. Waste rock was placed in dumps adjacent to the open pits or as backfill in mined-out open pits. Runoff and sediment release to natural drainages was controlled by waste rock dumps that block the ephemeral channels that cross the mine property and by diverting other runoff into open pits. Dump outslopes were composed dominantly of rhyolite blocks, rendering the outslopes coarse and durable and not susceptible to extensive erosion. The former practice of installing dump-top berms was abandoned in more recent years to prevent rapid erosion of finer dump-top and berm material after rapid rainstorms.

Under the proposed LMU approach, mining methods will remain essentially the same as those used in the past. Detailed evaluation of ore deposit geology and mining economics using sophisticated computer software has enabled the company to model the ore bodies and develop detailed pit and dump designs under varying economic scenarios. Each phase of future mine development will consist of multiple individual LMUs in multiple open pits. An LMU will be designed to expose sufficient ore to sustain mining for approximately one year.

The initial LMU mining phase, Phase I, will consist of eight open pits and related dumps, pit backfills and ore stockpiles. Phase I development will take place in the Fluro, Rainbow, Southwind, and Monitor deposit areas. A total of approximately 113 acres of new pit and dump-related disturbance will occur during Phase I, while approximately 21 acres of pit backfill will be created. A total of approximately 48,000 cubic yards of topsoil or topsoil substitute are anticipated to be recovered during Phase I. Concurrent reclamation during Phase I will require approximately 32,400 cubic yards of topsoil. Surplus topsoil, plus the quantity of topsoil in existing stockpiles will be retained for future reclamation. Existing stockpiled topsoil will be used first to the extent possible except when new topsoil salvage is underway and ultimate dump or backfill surfaces are prepared to receive topsoil and be revegetated in the coming fall season. In that case, the topsoil will be live-hauled and placed on the dump surfaces immediately after it is salvaged. Runoff and sedimentation will be managed and controlled in the same way that it has been in the past

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Ancillary facilities that support the mining operations include an equipment shop, above-ground fuel and water storage facilities, dust suppression water supply system, Class IIIb landfill, laboratory, administrative and engineering offices, and staff support buildings. All of the buildings are modular with the exception of the shop buildings, which are metal-clad and frame, slab-on-grade structures. These existing facilities will be used for the foreseeable future to support on-going operations. Facilities may be replaced or upgraded, but no new ancillary facilities are currently contemplated.

The Company has entered into an agreement with Juab County for maintenance, relocation, and upgrading of County Roads. This agreement calls for relocation of certain County roads to allow for pit and dump expansion and upgrading of at least one County road for ore haulage purposes. In accordance with the agreement, County roads affected by mining operations will either be temporarily closed or removed, as needed, and then re-established or be permanently closed and reclaimed. The agreement allows flexibility in planning for use and closure of roads as mining progresses; specific road closures and re-routings have only been agreed upon for

Phase I of proposed mining operations. County roads that are to remain after mining will not be reclaimed.

Ultimate mine development is currently planned to include mining of all known ore bodies to the maximum depth economics will allow using open pit methods. This will involve continued development of the Rainbow, Roadside/Fluro, Monitor, and Blue Chalk/Section 16 ore bodies as well as development of new open pits at the Southwind and Camp deposits. In addition, the Sigma Emma/Taurus ore bodies, where no mining has occurred for more than 20 years, will be further developed. Pit disturbances, including a 100-foot access control perimeter, will result in approximately 634 acres of disturbance and the areas of mine dumps and pit backfills will total approximately 1909 acres.

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The Company has evaluated the potential environmental impacts of its proposed operations (Section 6.0). Operations will be managed so as to minimize ecological and hydrological impacts to the extent that economic and worker safety factors allow. Appropriate cultural resource protective measures, as required by law, will be taken.

Reclamation planning has been guided by the Company's past experience at the Topaz Mining Properties. This experience is summarized in Section 7.0 of this MRP. Open pits will be backfilled to the maximum extent that ore body geometry and economics allow. The new LMU approach, combined with the expanded ore reserves will result in larger waste rock dumps than had been previously contemplated. Waste rock dumps have been located and designed as drainage-fills for economic and aesthetic reasons. Building valley-fill dumps as opposed to above-grade dumps on the alluvial fan surfaces minimizes dump outslope lengths and areas and relative dump relief, while typically maximizing dump storage volume per unit area. The dumps will be shaped to blend with surrounding terrain by constructing irregular, curved margins (as opposed to linear margins) and subtly recontouring the dump-top surfaces. Pit backfill surfaces will be recontoured in the same way. Dump-top margins will be rounded to reduce the visual impact and facilitate runoff and prevent excess accumulation on dump surfaces.

Salvaged topsoil will be placed in three to six inch layers. Dump tops, ore stockpiles, and the mine camp and related facilities will receive priority for topsoil placement. If available, at the time dump tops are reclaimed, topsoil will be sidecast from the dump-top margins over the dump outslopes. Soil amendments will be applied to the extent that past or ongoing experience demonstrates their value to restoration of vegetative cover and cost effectiveness. The Division-approved reclamation seed mix will be applied to all areas that receive topsoil as well as reclaimed roads. Seed will be applied by broadcast methods, after which the final surface treatment, "dimpling" with a sheeps-foot compactor, will be carried out.

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The Company requests variances from selected requirements of Rule R647-4-111: regrading of dump outslopes and pit backfill outslopes; reduction of open pit highwall angles; elimination of pit impoundments; and revegetation ground cover and survival.

Deleted: elimination of dams and impoundments as regards drainage-impounding waste rock dumps and open pits;

The Company will provide reclamation surety in a form and amount that meets the Division's requirements. Surety will include existing, unreclaimed disturbances that have not been released from reclamation liability by previous variances or releases and for reclamation liabilities anticipated to be incurred during Phase I. Surety will be based upon reclamation cost estimates that will be calculated following the Division's review and approval of a revised MRP.

1.0 MINING AND PERMITTING BACKGROUND

Brush Resources Inc. (formerly Brush Wellman Inc., and hereinafter referred to as "the Company") mines beryllium-bearing ore from the Company's Topaz Mining Properties. Beryllium ore was discovered west of Spor Mountain in Juab County, Utah in 1959. The first pit was opened in 1968 and the mill near Lyndyll began operation in 1969. Since that time the open-pit mining operations have been continuously active.

In compliance with the Utah Mined Land Reclamation Act of 1975, the Company filed a complete Notice of Intention and Mining and Reclamation Plan ("Plan") with the Division of Oil, Gas and Mining (the "Division") in March 1977. The Division granted tentative approval for this Plan later in 1977. In conjunction with expanded mining operations in l98O, the Company submitted a revised Plan to the Division, which again granted tentative approval of the revised Plan on April 7, 1981. The Plan approved by the Division generally consisted of covering the dumps with volcanic tuff removed from the pits and revegetation with a seed mix that was to be verified with revegetation test plots.

The approved Plan was therefore contingent upon test plot studies that were designed by the Division in 1977 and initiated by the Company in 1978. To reclaim the large dumps of rhyolite overburden material, the Division suggested that these dumps be covered with the fine-grained volcanic tuff. The use of tuff was considered appropriate at the time due to its fine-grained texture and water-holding capability. In addition, the mine pits were primarily located on hilly sites where topsoil was generally not available, or available in very limited quantities, for stockpiling for use in reclamation. The purpose of the test plots was to directly assess the ability of the tuff to sustain plant growth.

This tuff material was also sampled by the Division to evaluate its chemical characteristics as a potentially effective topsoil substitute; however, the Division did not evaluate the results at that time.

The test plots were then established in accordance with the Division's request to evaluate various seedbed preparations and plants for revegetation directly into the tuff material. In the interim, the Company followed the Division's recommendation to cover all dump surfaces with the tuff material. Since the test plot program was never evaluated or checked by the Division, finalization of the Plan remained an unresolved issue and final approval of the application, including reclamation bonding, remained pending for several years.

In 1985, the Division requested that the Company proceed with finalizing the Plan as well as estimating the reclamation cost for bonding purposes. The test plots, although continuously maintained, were not systematically evaluated by the Company until 1985, when they engaged reclamation consultants to assist in test plot evaluation and reclamation planning. The test plots were found to have generally failed to demonstrate suitable revegetation of the tuff material. It then became apparent that the previously approved Plan would be impossible to implement successfully. The Company revised the Plan in 1988 to deal with the existing tuff-covered dumps and utilize alternate methods to revegetate future disturbed sites. The plan was based on the test plot results, baseline soils and vegetation data secured in 1985 and a review of the literature as it applied to similar environments and Division records. The latter records revealed that the tuff material was saline and would not support vegetation. Three separate reports on revegetation test plots, plant communities and soils (JBR 1985a, b, and c) were enclosed with the 1988 Plan revision.

To control erosion on the existing tuff-covered dumps, various erosion control devices were designed. Also, scarifying the dump tops was planned. In hilly areas, where topsoils were not available from future pit developments, the rhyolite rock from the pits would be used to cover the dump tops and slopes and also the backfilled pits. The tuffs and altered rhyolite materials would be buried within the dumps. The rhyolite-covered areas would be seeded with rabbitbrush. For those future pit operations located on the alluvial slopes, soils would be salvaged at each site in sufficient quantities to topsoil the dumps and backfilled pits. These sites could then be seeded to provide a vegetative cover similar to the existing native plant community.

Although on March 22, 1978 The Company had completed and submitted MR Form 8 in which it committed to full compliance with all provisions of Rule M-1O[1], it became evident to the Company as mining progressed that full compliance with Rule M-1O was not possible and was, in fact, inconsistent with its approved Plan. Therefore, in the 1988 Reclamation Plan, the Company requested and the Division granted variances from portions of Rule M-10 for pit regrading and backfill, topsoil replacement, and dump slope regrading.

The reclamation cost estimate in the 1988 Plan revision followed a tentative future mining plan, which was scheduled for completion in the year 2037. Reclamation bonding was done on a "steady-state" basis for a bonding period that peaked after fifteen years. The steady state bond amount was formulated by first determining the dates of projected liability incurrence and release and then by calculating the cumulative reclamation liability over the entire anticipated period of mining and reclamation. The cumulative reclamation liability calculation enabled the determination of the maximum reclamation liability for the reclamation bond period. This amount then became the steady state bond amount for that period of bonding. The bond amount in the reclamation contract included a contingency for supervision and the calculated escalation for the fifteen-year period (ending 2003). The reclamation contract established the "Escalation Year" to be 2005.

A minor amendment to the Plan, completed in March 1996, dealt with a modification in the sequence of mining the Monitor and Blue Chalk deposits. Another minor amendment to the Plan, completed in June 1998, dealt with a modification in the sequence of mining the Rainbow #2 and Section 16 South #1 open pits.

A second test plot program designed by the Company was started in 1991 to evaluate varying topsoil thickness and fertilizer rates for revegetation of future dumps. Another test plot program was started in 1999 to evaluate the use of growth media other than topsoil for revegetation of dump tops. Results from these test plots have demonstrated that effective revegetation was possible with thinner soil cover. As a result the topsoil and growth media that had been salvaged to date and that had been identified in-place would be able to cover a greater disturbed area than had originally been anticipated. During this same time frame, the Company began using innovative techniques in dump construction, seedbed preparation and reseeding. The Company was subsequently awarded the Division's 2000 Earth Day Award for its efforts.

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[1] Rule M-10, which was entitled "Reclamation Standards," was part of the General Rules and Regulations for Mined Land Reclamation established in 1975 by the Board of Oil Gas and Mining. The requirements of what was Rule M-10

2.0 INTRODUCTION

This proposed Plan revision is intended to address the changes in mine development planning that have gradually occurred since the 1988 Plan revision. Mine plan changes have resulted due to the following: expanded and better-defined ore reserves and understanding of ore quality variability made possible by extensive development drilling and the availability of sophisticated mine-planning software; an improved understanding of process metallurgy and resultant demand for mill feed with variable chemical properties; greater flexibility in mining methods and schedules to accommodate mill demands; and, increases in future disturbance areas resulting from the expanded ore reserves . The Company seeks a life-of-mine approval for this revised MRP, which includes development of all known, currently economic beryllium deposits at the Company's privately held Topaz mining properties.

The Company expects to continue mining for many decades; however, reclamation surety is proposed only for an intermediate period that coincides with the development of the initially proposed phase of pit and waste rock dump development, termed Phase I. Mine development will then progress with mining and reclamation schedules subdivided into a series of subsequent development phases. Detailed planning has been carried out for this first phase and only generalized planning has been conducted for subsequent phases.

Surety for reclamation of all proposed Phase I mining disturbances and unreclaimed existing disturbances, other than those for which variances are granted, would be provided. The surety amount will be the maximum cumulative liability estimated in the "steady-state" reclamation schedule. Successive bonding requirements would be estimated on a per acre basis consistent with defined disturbance types.

Advances in mine planning have included delineating the ore reserve limits, optimizing the economic solutions for open pit mining, defining the economics of conducting

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can currently be found in Rules R647-4-110, Reclamation Plan and R647-4-111, Reclamation Practices.

adjacent underground operations, and designing ultimate overburden disposal facilities. Life-of-mine disturbances for both open pits and waste dumps (in particular) are expected to far exceed the disturbed acreage previously anticipated for the mine life.

Testing and experience have proven that the ore is highly variable, both in grade and metallurgical properties. Although blending based upon ore (beryllium) grade for milling purposes is straightforward, the associated blending for metallurgical properties becomes very complex. It is essential that the company be able to avoid incompatible ore blends. However, it is impractical and unnecessary to define or classify all of the potential blending schemes in advance. Instead, the optimum ore blends need to be determined step by step as the mine develops and specific mill feed demands are determined. This can be achieved by managing a variable and continuous mining scheme where insights gained from processing various ore blends can be used in adapting the mining sequence. Flexibility in the mining sequence is of the utmost importance in order to allow the mining operation to quickly adapt to ore feed demands.

The reclamation program will take full advantage of the Company's experience with past reclamation practices and techniques along with knowledge gained from the 1991 and 1999 test plots. Experience gained from reclamation techniques implemented during the 1990's, such as dump top rounding, dump outslope topsoiling, dump contouring, aerial seeding, applying composted manure, regrading and holistic methods, will also be used. The reclamation schedule will be developed for the first mining phase, estimated to be 10 to 15 years. The maximum cumulative reclamation liability for this period will be estimated. This estimate will provide the base surety amount that can then be adjusted for supervision and escalation. Finally, this revision includes a request for variance from certain portions of Rule R647-4-111, Reclamation Practices. References to the variances, pointing out the reasons for the request, can be found herein.

2.1 Location and Access

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The Topaz Mining Properties are located in Juab County, Utah, and are approximately 47 miles west-northwest of the Company's mill located near Delta, Utah. Access to the mine is by Highway 174 west from U.S. Highway 6. Figure 1 illustrates the location of the Topaz Mining Properties.

2.2 Surface and Mineral Ownership

The surface of the Topaz Mining Properties ("mining properties") is owned by the Company, a Utah Corporation. The Company's mailing address is P.O. Box 814, Delta, Utah 84624. The main telephone number is (435) 864-2701. Legal descriptions of the BRI properties are provided in Table 2.2-1 and the property locations are also shown on Figure 1.

Table 2.2-1 Topaz Mining Properties Legal Description

Township 12 South, Range 12 West, SLB&M		
Section 31	All	626.670 acres
School Section 32	All	640.000 acres
Township 12 South, Range 13 West, SLB&M		
School Section 36	All	640.000 acres
Township 13 South, Range 12 West, SLB&M		
Section 4	Lots 3 & 4, S½, S½NW¼	479.740 acres
Section 5	All	639.680 acres
Section 6	All	626.400 acres
Section 7	Lots 1-6, E½W½,W½E½,NE¼NE¼, SE¼SE¼	617.409 acres
Section 8	Lots 1-4, E½, N½NW¼,SE¼NW¼	523.715 acres
Section 9	Lots 1 & 2, N½, SW¼, W½SE¼	639.998 acres
Section 15	W½	320.000 acres
School Section 16	All	640.000 acres
Section 17	Lots 1-4, NE¼NE¼, S½NE¼	268.508 acres
Section 18	Lot 1, N½NE¼, NE¼NW¼	156.620 acres
Sections 7, 8 & 17	Tract 38	12.803 acres
Township 13 South, Range 13 West, SLB&M		
Section 1	Lots 1-6, 8, 10, 13, S½N½	457.880 acres
Section 12	Lots 1, 4, 5, 8	154.060 acres
	Total Acres	**7,443.483 acres**

The minerals to be mined are owned by the Company and the State of Utah, School and Institutional Trust Lands Administration (TLA). The TLA, Rochester & Pittsburgh Coal Company, and American Premier Underwriters Inc./PCC Technical Industries, Inc. have mineral production royalty agreements with the Company. Mineral rights interests are shown on Table 2.2-2.

Table 2.2-2 Topaz Mine Royalty Interest Holders

Royalty Interest Holder	Location
Utah State Metalliferous Leases # ML 18237 (640 acres), ML 19761 & 19762 (640 acres), ML 19804, 19805, 19806A, & 46961 (640 acres) School & Institutional Trust Lands Administration 675 East 500 South, Suite 500 Salt Lake City, UT 84102 Attention: Director 801.538.5100	Sec. 16, T135, R12W Sec. 32, T12S, R13W Sec. 36, T12S, R13W
Royalty under Real Estate and Mineral Acquisition Agreement dated February 1, 2001 (5,523 acres) School & Institutional Trust Lands Administration 675 East 500 South, Suite 500 Salt Lake City, UT 84102 Attention: Director 801.538.5100	See Table 2.2-1. All lands, except State school Sections 16, 32, and 36 and covered by existing Utah State metalliferous leases (listed above).

Royalty Interest Holder	Location
Vitro Lands (two parties, 50% of royalty interest paid to each); (1840 acres more or less) PCC Technical Industries, Inc. c/o American Premier Underwriters, Inc. 580 Walnut Street, 9th Floor Cincinnati, OH 45202 513.579.6828 Rochester & Pittsburgh Coal Co. P.O. Box 641684 Pittsburgh, PA 15264-1684 412.831.4497	See Appendix 1

3.0 SITE DESCRIPTION

3.1 Mineral Deposits and Geology

Davis (1984) described the geology and mineral deposits of the Topaz mining Properties as follows:

> The mining properties are located in the Spor Mountain/Topaz Mountain area in western Juab County, Utah. This area has been a commercial source of uranium, fluorspar, and beryllium. The beryllium district is on the west and southwest slopes of Spor Mountain. Bertrandite, a hydrous beryllium silicate ($Be_4Si_2O_7(OH)_2$) is the ore mined. Until 1969, the beryllium industry in the United States had been dependent upon imported beryl ore as the only source of beryllium. Beginning in 1969, the Company's extraction plant (near Lynddyl, Utah) has been in constant production, using bertrandite ore feed supplied from the mining properties. Beryllium is classified as a "Strategic Metal" by the U.S. Department of Defense.
>
> The Spor Mountain area is located in the Thomas Mountains-Tintic Mountains subdivision of the Basin and Range Physiographic Province. The area of the mining properties is made up chiefly of westward-tilted and intricately faulted Paleozoic sedimentary rocks that are locally intruded by volcanic rocks of Tertiary age. Flows and tuffs of Tertiary age also overlie the Paleozoic rocks with pronounced angular unconformity. The area is extensively faulted. Most of the faults trend northeast southwest. The faults have displacements ranging from 50 feet to 800 feet. They have played a major roll as conduits for the beryllium-mineralized solutions.
>
> Tertiary volcanic rocks of the Spor Mountain Formation consist of two informal members, the beryllium tuff and an overlying porphyritic rhyolite. The formation is dated at 21 million years (Lower Miocene). The two members occur together in most places and are restricted to the vicinity of Spor Mountain. The porphyritic rhyolite member crops out as flows, domes and small plugs.

> The beryllium tuff rests unconformably on older volcanic rocks of Tertiary age and sedimentary rocks of Paleozoic age. The beryllium tuff is an important stratigraphic unit, inasmuch as all production of beryllium in the district has come from it.
>
> Mining operations by the Company, within the beryllium tuff member, have encountered many variations in particle size and composition of the ore zone. The beryllium tuff deposits have been partially altered by hydrothermal (epithermal) fluids to a fine-grained mixture of montmorillonite-kaolinite clay, potassium feldspar, silica minerals, and fluorite. Distinctive zones of argillic and feldspathic alteration enclose the beryllium deposits. The bertrandite ore mineral of beryllium is submicroscopic, disseminated in the tuff, and concentrated in fluorite nodules.
>
> Many authors have published information on beryllium mineralization in the tuff, with several publications by David A. Lindsey.

Plate 1 is a Geology Map of the Topaz Mining Properties prepared by Lindsey (1979), which was a compilation of previous and new geological mapping. Cross sections shown on the map were based on interpretations.

3.2 Climate

The climate description provided in the 1988 Reclamation Plan (JBR, 1988) remains appropriate for the Topaz Mining Properties and is repeated below.

> The mining properties are located at an elevation of 4400-5300 feet. The climate is cool continental and very arid with a net evaporation loss. Annual precipitation is 6-8 inches. Sporadic snow occurs from November through April, but accumulations are minimal. Most precipitation comes as spring rains and summer showers; consequently, the growing season is confined to the late spring and intermittent summer periods.
>
> As a result of the low precipitation and small watershed areas of natural drainages in the mine area, all drainages are ephemeral. Other than water accumulated by runoff in the mine pits and minor accumulations that occasionally occur after major rainfall events behind dumps blocking drainages, there are no surface water impoundments in the area.

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3.3 Air Quality

The air quality description below is taken in its entirety from EA No. J-01-099-042-EA (JBR, 1999a):

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> This area has been designated as in attainment for all pollutants. The air quality in the project area is generally very good and is classified as a Prevention of Significant Deterioration (PSD) Class II Area. A Class II designation allows for a moderate level of increase in ambient levels of criteria pollutants (specifically PM_{10}, No_x, and SO_2). The nearest Class I area, the most restrictive, is Capitol Reef National Park, approximately 140 miles southeast the mining properties.
>
> Existing sources of air emissions in the project area include primarily fugitive dust (particulate matter) and diesel and gasoline combustion associated with current mining activities (for vehicles and generators).

3.4 Land Use

The pre-mining land use was grazing and wildlife habitat. The grazing use was primarily winter and spring sheep grazing. Currently, more limited sheep grazing along with some cattle grazing still takes place on the mine property. Wildlife use was and is confined to small mammals, birds, and antelope year-round range.

3.5 Surface Water Hydrology

According to the previously approved reclamation plan for the Topaz Mine (JBR, 1988) average annual rainfall at the site is approximately 6 to 8 inches, while evaporation rate is approximately 77 inches annually; this arid climate is responsible for the typical lack of surface waters seen at the mine site. However, occasionally, storm events do occur and they do produce runoff on an episodic basis. These normally occur as late summer/early fall thunderstorms, or winter frontal storms. The combination of infrequent and sporadic runoff that is insufficient to establish riparian vegetation, and rainfall that may be intense when it does occur, contributes to establishment of ephemeral channels that are easily eroded in the steeper range front area, but that become distributary depositional reaches as they progress westward. The former channel type is prevalent across much of the mine site, but trends to the latter type along the western edge of the property.

These characteristics have influenced runoff and sediment control strategies applied during previous and current mining activities at Topaz. Under the new plan, the general strategy for storm water management at the mine will be as discussed in the following paragraphs. Plate 2, the Hydrology Map shows the entire mine area and upgradient watersheds, surface water flow directions and end-of-mine-life open pit and waste rock dump locations.

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Currently, precipitation falling within pit boundaries and immediately adjacent minor up-gradient runoff accumulates in various open pits. The volume of water that accumulates is dependent upon rainfall amounts, evaporation rates, and pit floor characteristics. In all cases, however, the capacity of the pits is well in excess of any combination of precipitation and evaporation that would be expected under the most conservative of assumptions, ensuring that discharge out of the pits would not occur. Further, the accumulated water has been determined to be of good quality; some is pumped and used for dust control, and that remaining in the pits is used by area wildlife and livestock.

The majority of the precipitation falling on the mine area and its up-gradient watersheds is currently collected behind existing large overburden dumps built across these watersheds throughout the mine property. Generally, the runoff direction is westerly and runoff is primarily derived from up-gradient, undisturbed watersheds on the southwest slopes of Spor Mountain and the Thomas Range. Elevations of the contributing watersheds range from about 4600 feet at the mine site to 7100 feet in the Thomas Range. None of these watersheds produce perennial stream flow; all channels in the area are ephemeral, flowing only in direct response to rainfall or snowmelt.

Down gradient of the mine area, and at a distance across the alluvial valley, Fish Springs Wash flows northward. Under natural, pre-mining conditions, there was likely little surface connection between the upgradient channels and Fish Springs Wash, due to infiltration through channel beds into the alluvium. Instead, runoff served to provide recharge to whatever alluvial aquifer there may be associated with Fish Springs Wash.

Previous and existing mine operations have not substantively changed this scenario; most runoff is intercepted behind overburden dump faces where it evaporates or infiltrates.[2] Any runoff that is not intercepted makes its way westward until it, too, infiltrates into the alluvium.

Deleted: While ponded, it may serve as a water source for livestock and wildlife.

As mentioned above, under the proposed mining plan, storm water will continue to be handled in a similar manner. Most upgradient runoff will be kept out of active pit boundaries, but some temporary impoundment of runoff from small, local upgradient areas, as well as precipitation falling within pit boundaries themselves, will continue to occur. Several existing overburden dump footprints will be enlarged, and new overburden dumps will be created. They will intercept runoff from various sources, including up-gradient, undisturbed watersheds draining Spor Mountain and the Thomas Range; local undisturbed range-front areas within the mine property; existing disturbed areas related to ongoing mining activities; and previously reclaimed mine areas that have been released from bonding. None of the above-mentioned conditions will impact the surface water resources.

Deleted: In addition, backfilling of several existing pits will occur, and reclamation of completed mine areas will be ongoing.

3.6 Ground Water Hydrology

The mining properties are located between the western flank of Spor Mountain and the eastern edge of Fish Springs Flat. Ground water reportedly flows to the north-northwest on a basin-wide scale. No known springs are located hydraulically down-gradient from the mine area (Bolke, et. al., 1978). Data on water quality obtained from well samples have the characteristics of a Class II ground water under the Utah Ground Water Quality Protection Rules (JBR, 1999b).

Extensive drilling activity on the lower flanks of Spor Mountain has not encountered ground water (to depths in excess of 800 feet). Additional drilling in the vicinity of Fish Springs Flat has found ground water, presumably under unconfined conditions, beneath

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[2]During a major intense storm event in August 2002, water accumulated to a depth of approximately 6-8 feet behind the large overburden dump adjacent to the existing Rainbow pit. In a matter of no more than one week all of this water had infiltrated into either the channel bed or the overburden itself. No flow occurred in the channel downstream of the dump as a result.

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the known ore horizons. However, the existing open pits have not intercepted ground water (to depths of ±300 feet) and the planned open pits have been designed to not penetrate the water table (to depths of ±550 feet).

An "Assessment of Potential Impacts to Ground Water from Mining, Ore Stockpiling and Waste Rock Placement" (JBR, 1999b) was submitted to the Utah Division of Water Quality (DWQ) in 1999. The study demonstrated the low permeability of the ore and waste tuff and the low concentrations of solutes in leachate derived from contact of meteoric water with the rhyolite. Other considerations in the assessment included the low precipitation rate, the high evapotranspiration rate, and the natural influence on ground water quality of mineralization in the mine area, on Spor Mountain, and in the Dell to the east of Spor Mountain The potential impact of the mining operations to ground water quality was confirmed by the DWQ to be *de minimus* and is thereby considered permitted by rule under the Utah Ground Water Quality Protection Regulations. A copy of this document is provided in Appendix 3.

3.7 Soils

Soils in the mine area have not been mapped or described by the United States Soil Conservation Service. The soils were described in the 1988 Reclamation Plan (JBR, 1988) and in an Environmental Assessment performed in 1999 (JBR, 1999). Those documents described the soils as being derived chiefly from rhyolite and lesser amounts of limestone. The soils in the hills were described as follows: shallow and very stony loams; somewhat excessively drained; low available water capacity and rapid runoff; and slight hazard of erosion by wind or water. The soils of the lower valley slopes were described as consisting of relatively undeveloped layers of alluvium, largely sandy gravels and sandy loams, low available water capacity with rapid runoff, and moderate hazard of water erosion. Although these soils were generally classified as saline, they had been considered adequate for reclamation purposes. Soils analysis indicated that phosphorus and nitrogen fertilizer applications would benefit revegetation efforts.

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Since the 1988 Reclamation Plan was written, BRI has learned a great deal about the soils in the mine area through its topsoil salvage, revegetation, and revegetation test plot experiences. While the soils have the general characteristics previously described, their characteristics are variable based upon the bedrock or alluvial deposits from which they are derived. Accordingly, for purposes of soil salvage and reclamation planning, the soils have been characterized based upon bedrock type, BRI's experience with them as revegetation media, and field observations.

The Soils Map, Plate 3, depicts the soils types identified in the Company mine area based on their bedrock derivation and field observations. The bedrock types were determined using the Geology Map (Plate 1).

3.7.1 Alluvial Soils

Soils that are derived from alluvium or the alluvium itself when used as a growth medium have been called alluvial soils. The thickness of the alluvium itself is highly variable, ranging from as little as a few inches where is has covered shallow bedrock to many tens of feet in areas where bedrock is deeper, such as in the vicinity of the Monitor deposit located at the southwest margin of the mine property. The alluvium has been observed to contain variable quantities of cobbles and boulders and is the soil that had been described in the 1988 Reclamation Plan as sandy gravels and sandy loam.

Alluvial soils have been influenced by the beryllium tuff in areas where either the alluvial cover over the tuff deposits is thin or where eroded tuff has been mixed with alluvium. Sources of eroded tuff include exposed tuff deposits in the Company mine area itself and, in the vicinity of the Section 16 deposits, the tuff that is being actively eroded in and transported from the valley known as the Dell, to the east of Spor Mountain.

Although alluvial soils and much of the alluvium in the area may meet the textural requirements for a soil, the tendency for concentration of salts at depth in soils forming in arid environments often makes deeper alluvial soils unusable as revegetation media. This characteristic is exasperated when the alluvium has been influenced by the tuff.

Based on BRI's past experience with salvaging alluvial soils, more saline soils can occur at depth within the alluvial profile; therefore, salvage thicknesses are limited.

3.7.2 Rhyolite/latite-derived Soils

Soils derived from areas underlain by rhyolite or latite bedrock. These soils are typically rocky and of variable thickness. Of the two rock types, rhyolite is much more abundant; however, the soils derived from them have been combined for mapping and delineation purposes because latite generally occurs adjacent to rhyolite and the small quantity of latite-derived soils is relatively insignificant compared to the other soil types in the mine area. Latite contains much less quartz and more ferromagnesian and plagioclase minerals than does rhyolite. As a result, latite is more susceptible to weathering and would tend to develop more of a soil profile than would rhyolite. During the last 10 or 15 years when BRI has monitored soil recovery and revegetation success, rhyolite/latite derived soils have been recovered in significant quantities only from the vicinity of the Blue Chalk deposit. Under the proposed mine plan, rhyolite/latite derived soils represent a significant proportion of the soils that will be salvaged. The thickness of these soils is not well defined based on past salvage experience; however, this experience and field observations suggest that their thickness ranges from 3 to 6 inches. Native vegetation grows successfully on this soil type.

3.7.3 Tuff-derived Soils

Soils derived from the beryllium tuff have been called tuff-derived soils. In fact, many of the normal soil-forming processes are not likely to have occurred in the tuff; therefore, tuff and tuff-derived soils are essentially one in the same. The air fall tuff deposits in the Topaz Mountain area have been locally mineralized with beryllium and extensively hydrothermally altered. Sampling and analysis of tuff formally applied to waste rock dump surfaces as revegetation medium indicated that the tuff typically has very high electrical conductivity, exchangeable sodium percentage, and sodium adsorption ratio (JBR, 1985). These characteristics indicate that the tuff is salt-toxic and corresponds with observations of the tuff-covered dumps, which were virtually devoid of vegetation after having been seeded with a Division-approved seed mix. Tuff-derived soils are similarly salt-toxic and will be avoided during soil salvage operations.

3.7.4 Limestone-derived Soils

Soils derived from limestone and related rock types including dolomite and sandstone have been called limestone-derived soils. Limestone-derived soils are thin, ranging in thickness from near 0 to 6 inches, and rocky. Casual observations suggest that native vegetation is sparse and less diverse over areas underlain by limestone. BRI has not salvaged limestone-derived soils in the past, since areas where these soils occur have not been disturbed significantly in the past and those small areas where the soils were affected were disturbed before soil salvage was initiated in the mid-1980s.

3.8 Vegetation

Native vegetation on the mining properties was described in the 1988 Reclamation Plan (JBR, 1988) and in EA No. J-010-099-042-EA (JBR, 1999a). The following paragraphs are derived from the vegetation descriptions in these documents.

Vegetation is of the cold desert biome. Two desert shrub communities occupy the properties; the hill community has a grass understory and is located on the shallow stony loam soils, while the shrub community on the alluvial soils has a mixed grass-forb understory. Undisturbed areas are generally dominated by black sagebrush (*Artemisia nova*), snakeweed (*Gutierrezia sarothrae*), shadscale (*Artemisia confertifolia*), and spiny horsebrush (*Tetradymia spinosa*). Common grasses include galleta grass *(Hilaria jamesii)*, cheatgrass *(Brous tectorum)*, and Indian ricegrass *(Stipa hymenoides)*. Total ground cover varies from 24% on the alluvial slope community to 37% on the hill community.

Reclaimed areas are dominated by a shrub and grass community representative of the revegetation seed mix called for in the existing MRP. In the reclaimed areas, typical shrubs include green rabbitbrush, four-wing saltbush, and shadscale, with the common grasses being crested wheatgrass, squirreltail, and Indian ricegrass.

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3.9 Wildlife

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Wildlife at the mining properties was described in the 1999 environmental assessment (EA No. J-010-099-042-EA, JBR, 1999a) as follows:

> Game species that might occur or migrate through the area include mule deer, pronghorn antelope, and chukar. Chukar and pronghorn antelope take advantage of and benefit from the impounded water sources in the area. Other wildlife species that may inhabit the mining properties include rabbits, coyotes, kit foxes, rodents, and a variety of birds and reptiles.
>
> The nearby surrounding mountains provide abundant nesting sites for a variety of raptors. Although there are no known nesting sites within the mining properties, golden eagles, red-tailed hawks, kestrels, northern harriers, turkey vultures, and other raptors are likely to use the general area for hunting opportunities.

3.10 Archeological & Paleontological Resources

Archeological resources were described as follows in 1998 (JBR, 1998 - Cultural Resource Report 98-41):

> There are five cultural resource inventories previously completed on the mining properties. Two of these were performed by the BLM in 1984 and 1990. An inventory of 240 acres was conducted in 1996 and another inventory of 623 acres was completed in 1998.

A paleontological review was performed as part of an environmental assessment conducted in 1999 (EA No. J-010-099-042-EA, JBR, 1999) for Sections 9 and 16, T13S, R12W. According to this document, the Utah Geological Survey had no record of paleontological resources in the area.

As a result of the Utah West Desert Land Exchange of 2000 and a subsequent agreement between the Company and the Utah State Trust Lands Administration (TLA), the Company now owns all of the surface and most of the mineral rights for its Topaz Mining Properties. Some of the properties in which the Company acquired the surface estate in the land exchange are TLA Sections in which the minerals are owned and managed by TLA. A condition of the Certificate of Sale between the Company and TLA requires that the Company "... not commence or permit any additional surface disturbance with respect to the Subject Property [the TLA Sections] without a written determination from the Utah Division of State History and Purchaser (or DOGM if the proposed disturbance is subject to DOGM regulation) that no archeological or paleontological resources are present at the site of the proposed disturbance." Such a determination will require a cultural resources inventory by an archeologist permitted by the State Historic Preservation Officer (SHPO) and a paleontological literature search by an SHPO-approved paleontologist for any of the former state leases that have not been inventoried by the surveys completed in 1984, 1990, 1991, and 1996. Both the cultural resources and paleontological clearances would be the responsibility of the Company, which would retain the appropriately permitted specialists. Past cultural resource surveys covered the north half of Section 16, T13S, R12W; the other TLA Sections have not been surveyed.

As of the date of submittal of this MRP to the Division in 2005, there is some uncertainty regarding BRI's obligations to conduct cultural resources inventories on its private lands that were not formerly owned by TLA. Most of the areas to be disturbed in the initial phase of mining have been previously inventoried for cultural resources. BRI will commit to conduct any necessary supplemental cultural resources inventories on the previously un-inventoried lands that may be determined to be necessary prior to conducting its proposed mining disturbances. In addition, BRI's consultants will coordinate with the SHPO in determining the need for recording and or mitigation of any sites that may be encountered. In the event that it is determined to the satisfaction of the Division, SHPO, and BRI that, as a private land owner, BRI has no obligation to perform cultural resources inventories or site recordation, then BRI will consider the commitment to do so expressed above to be rescinded.

BRI recognizes that in the event that cultural or paleontological resources are uncovered as part of its operations, BRI is required to immediately cease working in the area of the discovery and notify SHPO. SHPO would then determine the need for mitigation, which would be carried out prior to proceeding with operations in the vicinity of the discovery.

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3.11 Public Access and Safety

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The Mining Properties are situated on private land. Unescorted public access is limited to through traffic on the county roads (see section 4.5, paragraph 4). Visitors to the mine are notified with signs to register at the mine camp when entering the mining properties. No unescorted access is granted in either existing or proposed mining areas. Livestock grazing is permitted at the company's discretion in undisturbed and revegetated areas in accordance with the terms and conditions of grazing permits issued by the Company. Surveillance personnel conduct regular patrols of the roads and mining areas to insure that visitors are not astray.

Safety is provided to the public in compliance with the Company's policies as well as Mine Safety and Health Administration (MSHA) rules. Open pits have 4-foot-high berms set 20 feet back from the pit crests to deter access to the highwall side of the pits. Mining area access roads are barricaded with earthen berms when not in use. Warning signs regarding operations are posted throughout the property in plain view of the county roads. During blasting operations, manned traffic control is placed on the roads and warning horns are sounded prior to any detonations.

4.0 EXISTING MINE OPERATIONS

The unique bertrandite ore bodies within the Company's mining properties are geographically and geologically separated. They occur as stratiform tuff deposits of widely varying thickness and inconsistent grade that dip steeply underneath massive rhyolite flow deposits. On-going mining operations have provided mill feed continuously since 1969.

Plates 4A and 4B show the current topography and unreclaimed disturbances at the mine site.

4.1 Mining Methods

The method for removing the rock overburden from the ore is known as "open pit pre-stripping." Traditionally, an earth-moving contractor was employed to remove the rock materials from the designed open pit area in order to expose a three to five year supply of bertrandite ore. This method has been used exclusively from 1968 through 1997, when the last pre-stripping was conducted. Early on in the operation, individual pits were designed and opened. As time passed, pits were designed and opened in pairs to allow for maximum resource recovery and blending flexibility. Overburden was placed adjacent to the stripping area according to the approved mining and reclamation plan in place at the time.

The technique for mining the ore is a modified bench system where the mining bench generally follows the ore body's strike and migrates down dip as mining advances. The beryllium mineralization in the host tuff is visually indistinguishable from the unmineralized tuff, widely disseminated and relatively low grade. These characteristics require a unique, highly sophisticated approach to determination of beryllium grade and ore control. The ore is sampled extensively, mapped meticulously, and dressed and lifted to stockpile with the utmost care. All engineering and mining efforts revolve around the ability to detect the beryllium with the neutron-activated beryllium analyzer instrument ("Berylometer"). The laboratory Berylometer is used to assay the drilling samples to enable detailed mine planning, and the field (portable) Berylometer is used to determine the exact point of cutoff in mining.

4.2 Pit Complexes

The Company's mining operations consist of twelve existing open pit projects along with their associated adjacent overburden dumps. In addition, there are two approved open pit projects withdrawn from development. Table 4.2-1 lists the open pit projects completed, in progress, or approved to date.

Table 4.2-1 Open Pits Completed, in Progress or Approved

Completed Open Pit Projects	Year(s) Opened	Year Closed
Roadside I	1968-69	1990
Blue Chalk North #1	1971-72	TBD
Fluro #1	1974-75	1990
Taurus	1979	1994
Sigma Emma & Little Sigma Emma	1979-80	1994
Roadside II	1981	1996
Rainbow #1	1985	1996

Completed Open Pit Projects	Year(s) Opened	Year Closed
Blue Chalk South #1	1985-86	TBD
Roadside/Fluro #3	1990-91	TBD
Section 16 North #1	1990-91	TBD
Open Pit Projects in Progress	**Years Opened**	**Year Closed**
Monitor #3	1996-97	TBD
Blue Chalk North #2	1996-97	TBD
Approved Open Pit Projects	**Year Approved**	**Year Closed**
Rainbow #2	2001	TBD
Section 16 South #1	2001	TBD

TBD – To Be Determined

4.3 Mining Sequence

Formulating the mining sequence on the Company's properties has evolved over several decades of exploration, development, and operations. Early on, geological and geochemical studies identified the existence of beryllium mineralization in economic quantities. Exploration drilling was rather quickly replaced with development drilling by several competing companies over seven principal ore trends. The Company eventually acquired the vast majority of the competitor's properties and data. The various ore bodies differ in physical and chemical characteristics; such as ore grade distribution, ore thickness, metallurgy, dip angle, minor faulting effects and rock mechanics. However, the ore bodies also have many traits in common; such as the stratigraphic sequence, lithology, and the ore bed strike and major fault orientations. The Company has taken advantage of the similarities in order to standardize development to the extent possible. The mining sequence as it progresses after discovery and before reclamation is as follows:

4.3.1 Development Drilling

Sample holes are drilled on a grid spacing of approximately 100 feet. The grid is generally oriented along the projected strike of the ore trend. Data collected from the drill samples provides information on the size of an ore body as well as its thickness and grade. Information is also collected on the nature of the rock materials that cover the ore body. Samples are cataloged and archived for future evaluation and testing.

4.3.2 Geologic Modeling

The sample data is combined with survey data and is assembled with computer software into a geologic model for each ore trend. Rock mechanics analysis and data validation is conducted in conjunction with building the models.

4.3.3 Economic Analysis

Computer software calculates the optimum open pit solution for maximum resource recovery on each ore body by means of a modified Lerch-Grossman algorithm. Economic and physical parameters are customized to best represent each trend. The resultant ultimate pit shells are the basis for determining economic ore reserves.

4.3.4 Open Pit and Dump Design

A section (or "Phase") of the ore body within the ultimate pit shell is selected for production. The primary factors for Phase selection are the tons of ore to be exposed, volume of overburden to be removed, and the weighted average grade of the ore to be mined. Open pit Phases are designed to expose a three to five year supply of ore. Final engineering designs are intended to emulate actual operations. Refinements include highwall catch benches, haul roads and sample drilling plans. Dumps are designed to create the least adverse effect on the terrain. The dumps are designed to place rock materials at their natural angle of repose as close to the open pit as practical, either by spreading into new areas or raising the height of existing dumps. Open pits may be backfilled after mining concludes if it is determined that doing so will not interfere with future mining operations.

4.3.5 Primary Stripping Operations

Davis (1984) described primary stripping at the mining properties as follows:

> Earth-moving contractors are invited to bid on overburden removal projects. The selected contractor then performs the actual work with supervision of the project under the direction of Company personnel. Any topsoil or suitable growth media that can be stripped with conventional mining equipment is segregated and handled for reclamation purposes. The bulk of the waste overburden is comprised of rhyolite, which is blasted and removed with loaders and haul trucks. The materials that do not require blasting, such as alluvium and tuff, can be removed with scrapers.

4.3.6 Secondary Drilling

Davis (1984) also described secondary drilling at the mine:

> The pit design includes a material cover on the ore in adequate thickness to construct drilling benches above the ore seam. A secondary drill-sampling program is required to further study and delineate the ore. Drill stations are staked out on 25-foot centers. Drilling is vertical from the top of the cover, down through the ore body and into the gangue materials beneath the ore. Samples are taken at 2-foot intervals, processed on site, and assayed with the laboratory Berylometer. A detailed structural model of the ore seam is created from the data with computer software. Mapping includes cross-sections depicting the top ore horizon ("hanging wall") and the bottom ore horizon ("foot wall") as well as hanging wall and footwall structure contour plans. These maps are vital to ore control.

4.3.7 Secondary Stripping

Davis' (1984) description of secondary stripping follows:

> Company personnel do the final uncovering of the ore seam. Track-type tractor dozers (460 hp), hydraulic excavators (220 hp), and wheel tractor scrapers (31-34 cubic yard) remove the waste material while ore control technicians protect the ore. The field Berylometer and ore mapping is critical to achieving the high ore recovery and low ore dilution objectives. The waste material is placed either into disposal cells in the overburden dumps or in depleted areas of the open pit.

4.3.8 Ore Mining (after Davis, 1984)

Company personnel lift the ore with the same equipment and in similar fashion to the secondary stripping methods discussed above (4.3.7). Because of the irregular ore grade distribution in the ground, the ore is not shipped directly to the mill and is instead stockpiled at the mine.

4.4 Ore Stockpiles

Davis (1984) described the ore stockpile evaluation and management practices that have been used since that time:

> The ore is lifted from predetermined areas within the open pit and placed on a designed ore stockpile pad. During stockpile construction, care is taken to spread the ore into relatively thin and intermingling layers. This method creates a fairly homogeneous blend that is acceptable for mill feed.
>
> After the stockpile is constructed, its dimensions are surveyed. It is drilled and sampled for assaying with the laboratory Berylometer. Finally, a formal information report is assembled. The report includes the data and mapping needed to illustrate grade and moisture distribution throughout the stockpile as well productivity and ore recovery details. The stockpile is available for shipping

on demand as ore feed to the company's Delta mill. Contractors transport the ore to the mill in trucks over a hard-surfaced road.

4.5 Ancillary Facilities

The ancillary facilities on the mine property are comprised of the mine camp, a contractor's camp, the road system, and the waterworks. The mine camp and existing roads are shown on Plates 4A and 4B.

The mine camp area is located primarily within the NE¼NE¼NE¼ of Section 8, in T13S, R12W. It consists of modular structures, metal and/or wood buildings, and a gasoline, diesel fuel and waste oil tank farm that is comprised entirely of aboveground storage tanks. The buildings and electrical generators are on concrete foundations and floors. Potable water is delivered to the mine by tanker and is stored in cisterns. There are no utility transmission lines in the mine vicinity.

There is a second camp area located mostly within the SE¼SW¼SE¼ of Section 8, in T13S, R12W. It has been utilized intermittently by earth-moving contractors during stripping operations as a "lay down" area for setting up business trailers and has a fuel containment liner and berm in place. A "Spill Prevention, Control, and Countermeasure Plan" (SPCC Plan) is in place at the mine, which complies with the appropriate regulations and provides adequate containment of petroleum products.

The road system throughout the mine property consists of Class B and Class D Juab County roads and temporary mining access roads. Juab County asserts its right to preserve and maintain those roads that are by necessity made available to the public. Mining access roads are constructed and maintained for ongoing mine development. These private access roads are reclaimed when they are no longer needed.

The non-potable water supply necessary for dust control and other uses in mining operations is provided by a system that includes a well (located in Section 16, T31S, R13W, SLM), surface pipeline, lined storage pond and standpipe. Water is also collected and drawn from numerous ponds found in the pit bottoms.

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4.6 Waste Disposal

The mine has an on-site Class IIIb sanitary landfill for disposal of solid wastes. It is located within the SE¼SE¼SE¼ of Section 8, in T13S, R12W. The Utah Bureau of Solid and Hazardous Waste issued a permit for the landfill on August 12, 1985. In October 2002, the Division of Solid and Hazardous Waste issued a Permit by Rule for BRI's on-site landfill under UAC R315-318. UAC R315-318-2(1)(b) provides for permit by rule for "disposal operations or activities which are required to operate under the conditions of a Utah Division of Oil, Gas and Mining permit or plan approval", if the facility "began receiving waste prior to July 15, 1993." The BRI landfill was in operation well before that date; the landfill began operating soon after the August 12, 1985 permit was issued.

The October 8, 2002 Permit by Rule document and the accompanying transmittal letter are included herein as Appendix 2.

The key to permit by rule is "...that the closure and reclamation activities at the site will be as stringent as the requirements for an Industrial Solid Waste Landfill as specified in ... UAC R315-304-5(2)(b)" (Dennis Downs, October 8, 2002, Letter to D. Perry, BRI, re: Mine Class IIIb Landfill Permit by Rule see Appendix 2). Rule R315-304-5(2)(b) in turn requires that the landfill meet the closure requirements of R315-305-5(5)(b) which states the following:

(b) The owner or operator of a Class IV or VI Landfill shall close the facility by
- (i) leveling the waste to the extent practicable;
- (ii) covering the waste with a minimum of two feet of soil, including six inches of topsoil;
- (iii) contouring the cover as specified in Subsection R315-303-3(4)(a)(iii); and,
- (iv) seeding the cover with grass, other shallow rooted vegetation, or other native vegetation or covering in another manner approved by the Executive Secretary to minimize erosion.

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Note that since the landfill is permitted by rule, the Executive Secretary approval referenced in the previous citation is not required; the Division of Oil Gas and Mining has the authority to approve any modified seed mix or cover type.

The reference to Rule R315-303-3(4)(a)(iii) is apparently no longer applicable, since this rule is no longer part of DSHW's regulatory program (www.hazardouswaste.utah.gov/ADOBE/solid-wasterules/R315-303.eff.pdf).

4.7 Topsoil Management

Prior to the 1988 plan revision topsoil was not stockpiled. Mining disturbances up to that time were not treated with topsoil or reseeded. Beginning in 1989, the Company has stockpiled the salvageable quantities of topsoil or topsoil substitute encountered during overburden removal operations. The salvaged soils have been stockpiled in designated areas adjacent to the pits and dumps. These areas are selected to minimize erosion of the topsoil. The topsoil piles are reseeded with the Division-recommended seed mix in the first full growing season following their construction.

In addition to topsoil, other subsoils and alluvial deposits have been salvaged as substitute "growth media" for reclamation treatments. Test plot results and BRI's experience since 1989 have shown that the stony soils and gravels, when properly handled, can take the place of topsoil in revegetation efforts. Similarly, past experience has also shown that soil salinity concentrations at salt-toxic levels can occur at relatively shallow depth in alluvial soils.

4.8 Runoff & Sediment Control Plan

This description is based upon the historic absence (over 20+ years) of noteworthy impoundments of water behind the waste rock dumps that span the natural, small ephemeral drainages. The on-site stormwater control plan provides remedies for the occasional stormwater events that cause minor erosions. The dumps are routinely monitored and repaired as needed. Most dumps have a significant amount of excess storage capacity beyond what is required. Also, water stored behind these dumps that is known to infiltrate or evaporate quickly. The coarse rhyolite rock comprising most of the dumps is very porous. The alluvial channels and slopes behind the dumps are also quite permeable. Runoff from the upper drainages usually infiltrates soon after leaving the foothills and channels become very small and poorly defined.

Deleted: derived from the 1988 Reclamation Plan (JBR, 1988). The runoff control plan for the property is comprised of two types of features: impoundments and diversions. Dumps that span a drainage channel and pits that intercept runoff serve as impoundments for several small drainages. For larger drainages with higher runoff volumes, or for areas behind dumps with insufficient capacity to store runoff, diversion ditches are designed to carry the storm runoff through the mine site. These features are intended to minimize the negative impacts of runoff and erosion both on and off site. The primary source of sediment at the mining property is related to erosion of the older tuff-covered dumps.¶
***4.8.1 Impoundments*¶**
Design standards for impoundments are employed to insure that the dumps will provide adequate control during future storm events. Each impoundment must be able to store the 100-year, 24-hour runoff volume, it must have at least a 50-year sediment capacity, and it must not be required to store more than 20 acre feet of water resulting from the design storm. In cases where these conditions are not met, diversion structures are the method of control.

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Deleted: Design calculations assume that no infiltration takes place. Therefore, the actual amount of water that is stored behind these dumps is significantly less than the design amounts. The impoundment features will not be removed from the drainages during reclamation. Since the dumps meet the appropriate hydrologic storage requirements, a variance from Rule M-10 (8) was granted in 1988.

The Company manages runoff and other conditions as set forth in their Multi-Sector General Permit for Storm Water Associated with Industrial Activities.

5.0 PROPOSED MINE OPERATIONS

There have been significant changes in mine development since the 1988 Plan revision. These changes include expanded and better-defined ore reserves, increases in future disturbance areas, the need to provide variable ore feed qualities, and flexibility in mining methods and schedules to accommodate mill demands. The following modifications to the existing mine operations are proposed as a reasonable solution to the changes.

5.1 Mining Sequence

The mining properties will ultimately be developed into seven open pits and their associated overburden dumps and backfill areas. Each ultimate pit and dump will involve the development of a number of "Logical Mining Units" or LMUs (See 5.1.1 below). A potential for more than one hundred LMUs is estimated as mining operations attain the ultimate configuration.

The mining sequence on the Company's properties will continue to make the most of the knowledge gained from the past exploration, development, and operations; however, it will be highly adaptable to respond to the Delta mill's ore feed needs while avoiding incompatibility in the ore blends. No additional development drilling is anticipated in order to mine the known ore reserves. The geologic interpretation of the ore setting is also complete. The Company will continue to take advantage of any similarities among the various ore bodies in order to standardize development to the extent possible. The ore mining technique itself will remain very much the same as the existing mine operation.

5.1.1 Logical Mining Units Concept

Instead of constructing large open pits in matched pairs, as has been the past practice at the mine, one or more relatively small pit(s) will be excavated at a time. These

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In areas where it is not practical to store water, either due to runoff amounts or dump capacities, diversions are designed to convey runoff flow around the dump to natural ground downstream. All ditches are conservatively designed to be non-erosive and to safely pass the 50-year, 24-hour storm event with adequate freeboard.¶
4.8.3 Sediments¶
The sparse vegetation and high clay content of the tuff materials cause some precipitation accumulations to run off and erode the dump slopes. To control sediment discharge from these tuff-covered slopes, berms are constructed at the toes of dumps to catch the sediments and provide a seedbed for plant growth. The berms are seeded, fertilized and mulched. The resulting vegetation on the berms serves as a seed source for volunteer plant cover. Consequently, these vegetated berms have initiated gradual plant colonization of the tuff slopes.¶

Deleted: is authorized to discharge from the mine site to the waters of the State in accordance with discharge point(s), effluent limitations, monitoring requirements, smaller open pits will each be sized to expose an approximate one-year-plus supply of ore feed. This process will be repeated by opening individual pits on the various ore bodies on a revolving basis. The ability to simultaneously operate multiple LMUs will allow the mine to adjust the quantity of ore mined, the ore grade, and the ore chemistry as necessary to meet the need for increased flexibility in mill feed. The new LMU approach, combined with the expanded ore reserves will result in larger waste rock dumps than had been planned under the previous mine plan.

5.1.2 Initial Logical Mining Units

The initial phase, designated Phase 1, of mining under the new LMU concept will consist of eight open pits and related dumps, pit backfills, and ore stockpiles. Table 5.1-1 lists the eight Phase 1 LMUs and the disturbed areas associated with their respective pit, dump and backfill acreages.

Table 5.1-1 Proposed Phase 1 "Logical Mining Units" Disturbed Areas

Open Pit Projects	Pit Acres	Dump Acres	Backfill Acres
Fluro LMU #1	3.8	-	6.3
Fluro LMU #2	2.6	-	6.0
Rainbow LMU #1	5.9	16.7	-
Rainbow LMU #2	3.5	24.3	-
Rainbow LMU #3	3.5	21.7	-
South Wind LMU #1	6.4	17.5	-
Monitor LMU #1	3.7	-	4.8
Fluro LMU #3	3.3	-	6.3
Total – Eight Projects	32.6	80.2	20.7

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The proposed Phase 1 LMU developments are shown on Plates 5A and 5B.

5.1.3 Proposed Ultimate Mine Plan

The plan for ultimate development will result in a total of seven open pits, related waste rock dumps and ancillary facilities (primarily roads and ore stockpiles). Table 5.1-2 summarizes the currently estimated ultimate total acreage that will be disturbed and then reclaimed (or exempted from reclamation requirements by variance) through the life of the mine.

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Table 5.1-2 Proposed Ultimate Mine Development Disturbed Area

Pit Complex or Ancillary Area	Pit Acres	Dump/Backfill Acres	Other
Rainbow	87.0	384.2	included
Roadside/Fluro	78.5	296.8	included
Monitor	62.7	205.4	included
South Wind	82.6	164.6	included
Mine Camp	N/A	N/A	
Camp	35.1	61.8	included
Blue Chalk/Section 16	217.2	420.0	included
Sigma Emma/Taurus	71.7	308.8	included
Mine Roads	N/A	N/A	
Total –	634.8	1841.5	

Note: Ore pad space & access roads included. A perimeter 100 feet wide around the pits and dumps is included. This amounts to a total of 340 included acres.

5.2 Mining Methods

The mining methods, beginning with economic analysis and open pit and dump design and concluding with reclamation are very similar to existing operations as described in sections 4.3.3 through 4.3.8 above and are further described as follows:

5.2.1 Economic Analysis

Computer software will calculate the optimum open pit solution for maximum resource recovery on each ore body by means of a modified Lerch-Grossman algorithm. Economic and physical parameters will be periodically customized to best represent each trend. The resultant ultimate pit shells will be the basis for determining economic ore reserves.

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5.2.2 *Open Pit and Dump Design*

A section or "Logical Mining Unit" (LMU) of the ore body within the ultimate pit shell will be selected for production. The primary factors for LMU selection are the tons of ore to be exposed, volume of overburden to be removed, and the weighted average grade of the ore to be mined. Open pit LMUs will be designed to expose an approximate one-year supply of ore. Final engineering designs will emulate actual operations. Refinements include highwall catch benches, haul roads and sample drilling plans. Dumps will be designed to create the least adverse effect on the terrain while providing the quickest possible opportunity for reclamation. The dumps will be designed to place rock materials at their natural angle of repose as close to the open pit as practical, either by spreading into new areas or raising the height of existing dumps. Open pits may be backfilled after mining concludes if it is determined that doing so will not interfere with future mining operations.

5.2.3 *Primary Stripping Operations*

The proposed primary stripping on the mining properties will be performed in similar manner as that described by Davis (1984) and duplicated in section 4.3.5 above, except at a smaller scale. Earth-moving contractors will be invited to bid on overburden removal projects. The selected contractor will then perform the actual work with supervision of the project under the direction of Company personnel. If the Company elects to engage in the stripping themselves, the contractor would be waived. The mobile heavy equipment typically engaged in primary stripping includes blast-hole drills (450-600hp), wheel loaders (500-800hp), mining trucks (60-110 ton), track-type tractor dozers (300-600hp), hydraulic excavators (200-300hp), motor graders (200hp), and water trucks (3,000-10,000 gallons).

5.2.4 *Secondary Drilling*

The proposed secondary drilling at the mine will be conducted in similar manner as described by Davis (1984) in section 4.3.6 above.

5.2.5 *Secondary Stripping*

The proposed secondary stripping is also very similar to Davis' (1984) description in section 4.3.7 above.

5.2.6 Ore Mining

Company personnel will lift the ore in similar fashion to the ore mining methods discussed above in section (4.3.8). Because of the irregular ore grade distribution in the ground, the ore will not be shipped directly to the mill and will instead be stockpiled at the mine.

5.3 Ore Stockpiles

The ore stockpiles will continue to be constructed in a manner very similar to that described by Davis (1984) in section 4.4 above.

5.4 Ancillary Facilities

The ancillary facilities will remain essentially as described in section 4.5 above. There will be occasional improvements and upgrades to the mine camp infrastructure over the life of the mine and changes to the roads on the mine property will also occur.

BRI and Juab County have executed a memorandum of understanding for closure, re-establishment, and maintenance of roads affected by the first mining phase that are claimed by Juab County as public rights of way. A copy of that agreement is provided in Appendix 5. This agreement accomplishes the following: identification of those roads on the BRI property that are claimed by Juab County, all of which are Class D roads; those County-claimed roads that will be permanently closed as a consequence of planned mining operations; the County-claimed roads that will remain in their current locations and conditions; and those County-claimed road segments that will be relocated or upgraded by BRI to facilitate its on-going operations. In addition, the agreement establishes a mutual commitment of both parties to cooperate fully in making any necessary future changes to the agreement as the result of changes in future mining and development plans that may occur.

5.5 Waste Disposal

The mine will continue to use the on-site sanitary landfill for disposal of solid wastes. It is located within the SE¼, SE¼, SE¼ of Section 8, in T13S, R12W. The Utah Bureau of Solid and Hazardous Waste issued a permit for the landfill on August 12, 1985. In October 2002, the Division of Solid and Hazardous Waste issued a Permit by Rule for BRI's on-site landfill under UAC R315-318 (refer also to section 4.6).

5.6 Topsoil Management

Salvageable quantities of topsoil encountered during stripping operations will continue to be stockpiled and stockpiles will be managed as described in section 4.7 above, with the exception of instances when topsoil salvaging is underway and ultimate dump surfaces are prepared to receive topsoil and be revegetated in the coming fall season. In that case, the topsoil will be live-hauled and placed on the dump surfaces immediately after it is salvaged. Topsoil will be recovered from all areas to be disturbed including, pit, dump, and road footprints.

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Field observations from past salvage activities have suggested that visible salt precipitation in the soil profile may mark the top of more saline zones in the alluvial soils; however, no formal system for gathering and compiling information on salvaged soils has been developed. BRI plans to adopt a soil testing and assessment program to support its future topsoil salvage operations which, combined with a set of uniform field observations, will meet the objectives of enabling the company to better assess soil quality in general, its value as a growth medium for use in revegetation, and the appropriateness and need for soil amendments. This program, for which BRI will seek Division input, is anticipated to include the observation and measurement of the physical and chemical soil parameters necessary to meet the foregoing objectives while being cost effective and able to be carried out by BRI staff technicians with minimal outside oversight and support.

The proposed soil assessment program will be developed by mid 2005, prior to commencement of mining operations under this proposed MRP.

Future topsoil and soil substitute salvage operations will focus on salvaging sufficient soil to enable effective topsoil replacement while avoiding undesirable, salt-toxic soils. Because of the potential for recovery of saline soils at depth and because past experience has shown that thin (3 to 6-inch) topsoil layers provide for optimal revegetation, excessive quantities of soils will not be recovered from alluvial soils or alluvium itself. Unless the results of the soil assessment program indicate otherwise, other soil types intended for salvage will be recovered to the maximum possible extent.

Based upon the soil characteristics as currently understood (refer to section 3.7), the anticipated recoverable thicknesses and limitations for the various soil types are described in the following sections.

5.6.1 Alluvial Soils

Based on BRI's past experience with salvaging alluvial soils, more saline soils can occur at depth within the alluvial profile; therefore, salvage thicknesses are estimated to range from 6 to 12 inches for this general soil type. For purposes of estimating salvageable quantities, a six-inch nominal thickness was presumed.

5.6.2 Rhyolite/latite-derived Soils

The thickness of these soils is not well-defined based on past salvage experience; however, field observations and salvage experience in the vicinity of the Blue Chalk deposit suggest that their thickness ranges from 3 to 6 inches. The average salvage thickness has been estimated at 4.5 inches.

5.6.3 Tuff-derived Soils

As described in section 3.7, tuff and any soils that form on them are salt-toxic and will be avoided during soil salvage operations.

5.6.4 Limestone-derived Soils

Limestone-derived soils are thin, ranging in thickness from near 0 to 6 inches, and rocky. BRI has not salvaged limestone-derived soils in the past, however, the average salvage thickness has been estimated at 3 inches.

5.6.5 Rock Outcrop

Areas mapped on the Soils Map (Plate 3) as rock outcrop are anticipated to have little soil development and no salvageable volumes of topsoil are anticipated to be present in these areas.

5.6.6 Topsoil Salvage Volumes

Topsoil salvage areas and volumes have been calculated for both Phase I LMU development and ultimate mine development. Table 5.6-1 presents estimated salvage volumes by soil type and project area for the first set of LMUs.

Table 5.6-1 Estimated Salvageable Soil Volumes – Initial LMUs

Open Pits	Volume (yd.3)						Area (Ac.)	Volume (yd.3)
Area ID	A-s	R/Ls	T-s	Ls-s	Ro/c	NS	Total	
Southwind	5,160	0	0	0	0	0	6.4	5,160
Monitor	0	0	0	0	0	0	3.7	0
Fluro	0	2789	0	0	0	0	9.7	2789
Rainbow	763	6863	0	0	0	0	12.9	7626
Total	5924	9652	0	0	0	0	32.6	15575
Wasterock Dumps	**Volume (yd.3)**						**Area (Ac.)**	**Volume (yd.3)**
Area ID	**A-s**	**R/Ls**	**T-s**	**Ls-s**	**Ro/c**	**NS**	**Total**	
Southwind	8084	4521	0	0	0	0	17.5	12,605
Monitor		0	0	0	0	0	4.8	0
Fluro		73	0	0	0	0	15.9	73
Rainbow		0	0	19,852	0	0	62.7	19,852
Total	8,084	4591	-	19,852	-	-	100.9	32,530
Total - Proposed Initial LMUs	14007	14,245	-	19,852	-	-	133.5	48,105

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Table 5.6-2 shows the estimated salvage volumes available by soil type for the entire ultimate disturbed area.

Table 5.6-2 Estimated Salvageable Soil Volumes – Ultimate Mine Development

Open Pits	Volume (yd.3)						Area (Ac.)	Volume (yd.3)
Area ID	A-s	R/L-s	T-s	Ls-s	Ro/c	NS	Total	
Southwind	65,703	672	-		-	-	82.6	66,375
Camp	17,572	4,332	-	2,463	-	-	35.1	24,367
Sigma	20,207	6,857	-	1,842	-	-	71.7	28,889
Monitor	41,488	-	-	-	-	-	62.7	41,488
Roadside Fluro	23,040	21,242	-	-	-	-	78.5	44,283
Rainbow	53,547	10,320	-	-	-	-	87.0	63,867
Sec. 16/Blue Chalk	25,811	85,050	-	20	-	-	217.2	110,861
Total	247,369	128,473	-	4,306	-	-	634.8	380,150

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Wasterock Dumps	Volume (yd.3)						Area (Ac.)	Volume (yd.3)
Area ID	A-s	R/L-s	T-s	Ls-s	Ro/c	NS	Total	
Southwind	115,966	5,491	-	2,553	-	-	164.6	124,010
Camp	36,993	7,653	-	1,316	-	-	61.8	45,962
Sigma	56,840	4,539	-	27,493	-	-	308.8	88,872
Monitor	80,992	6,380	-	-	-	-	205.4	90,773
Roadside Fluro	64,512	15,884	-	14,329	-	-	296.8	94,725
Rainbow	62,066	17,090	-	53,378	-	-	384.2	132,534

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Wasterock Dumps	Volume (yd.3)						Area (Ac.)	Volume (yd.3)
Area ID	A-s	R/L-s	T-s	Ls-s	Ro/c	NS	Total	
Sec. 16/Blue Chalk	126,339	14,575	-	10,119	-	-	420.0	151,032
Total	547,108	71,612	-	109,187	-	-	1841.5	727,908
Total - Ultimate Disturbance	794,477	200,085	-	113,495	-	-	2,476.2	1,108,058

5.6.7 Topsoil Stockpiles

During Phase I LMU development, topsoil will be stockpiled within or adjacent to the areas to be disturbed by development of each Phase I LMU. Topsoil stockpile locations are shown on Figures 6A to 10, the Reclamation Treatment Maps.

5.7 Runoff & Sediment Control Plan

The proposed runoff control plan for the property is as described in section 4.8 above. Water stored behind the waste rock dumps is known to infiltrate or evaporate quickly. Also, the coarse rhyolite rock comprising the proposed dumps is very porous. The alluvial channels and slopes behind these dumps are also quite permeable. In the event of minor erosions, the dumps will be routinely monitored and repaired as needed and set forth in the Company's Multi-Section General Permit for Storm Water Associated with Industrial Activities.

5.8 Public Access & Safety

The proposed public access and safety considerations will continue as described in Section 3.11 above.

5.9 Mining of the Proposed Initial LMUs

Using the mining methods described above, the eight initial LMUs listed in Table 5.1-1 will be mined during the initial mining period. The following brief narratives describe the reasoning behind selection of the waste rock dump sites, the dumping sequences and siting of access roads and stockpile locations.

The locations of the proposed LMUs are shown on Plates 5A and 5B. and the individual LMU components are described on the larger scale maps referenced in the following subsections. The descriptions of each LMU are presented in the currently anticipated order of development and production; however, the exact sequence may change as the

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result of economic considerations. The currently foreseen potential sequence modifications are the possibility of continuing mining of the Fluro LMU 3 following completion of LMU 2 and the possibility of moving development of the Monitor LMU 1 ahead of that for the Southwind deposit.

5.9.1 Fluro LMU Pits 1 and 2

The Fluro LMU Pits 1 and 2 will expand the existing Fluro Pit to the south. Waste rock mined from these pits will be used to backfill the existing Fluro pit. Plates 6A and 6B are topographic maps showing the pit, waste placement locations, ore stockpile location, post-placement topography, and reclamation treatments for the Fluro LMU pits 1 and 2. Plate 6C is an illustration with photographs showing current views of the Fluro LMU pit locations and the existing waste rock dump located to the north and northeast of the proposed pits.

Mining will commence with Pit 1, which will expand the existing Fluro Pit approximately 700 feet to the south (Plate 6A). Waste rock from this initial pit will be hauled approximately 2000 feet to the north for placement into the north end of the existing Roadside 2 Pit, where it will be used as backfill. The dump surface will be at an approximate elevation of 4870 feet AMSL and will blend with the existing Roadside/Fluro dump and the adjacent terrain.

Fluro LMU Pit 2 will be the second new pit in the Fluro ore body. This pit will be a westward extension of Pit 1, as shown in Plate 6B." Waste rock from Pit 2 will be placed as backfill into the existing Roadside 2 and Roadside/Fluro 3 Pits. Placement of this waste rock will advance the backfill placed during mining of Pit 1 approximately 100 to 200 feet to the south.

The Fluro ore pad will be used for placement of ore mined from the three proposed Fluro pits, Pits 1 and 2, discussed above, and Pit 3, discussed below.

5.9.2 Rainbow LMU Pits 1, 2, and 3

During the initial phase of mining, the Rainbow ore body will be developed with three separate pits, as shown sequentially on the maps in Plates 7A, 7B, and 7C. This series of maps also shows the locations of the waste rock dumps, ore pad, and ore and waste haul roads. Plates 7D and 7E illustrate the terrain as it exists today in the vicinity of the proposed expanded Rainbow pits and the new Rainbow dumps and the existing Rainbow dump.

Pit 1, the initial pit in the Rainbow LMU will be advanced approximately 1200 feet to the south of the east side of the existing Rainbow Pit. Waste rock from Pit 1 will be hauled to the northeast along a segment of the existing haul road and then on a new waste rock haul road to new Rainbow dumps designated Dumps 1 and 3. These will be new, valley-fill dumps (Plate 7A). Rainbow Pits 2 and 3 will expand Pit 1 of the LMU sequentially to the west (Plates 7B and 7C), resulting in a pit width of approximately 600 feet. Dump 3 will be expanded with development of Pit 2 and further expanded as Pit 3 is developed. Dump 2 will be constructed with waste rock from Pit 3.

The reserves of the Rainbow ore body extend down-dip to the west; therefore the existing Rainbow Pit and the proposed three LMU pits must remain open for future development and cannot be backfilled.

The existing Rainbow ore pad will be used during the expansion of the Rainbow Pit (Plates 7A, 7B, and 7C).

5.9.3 Southwind LMU Pit 1

The Southwind ore body will be opened as part of the initial phase of mining during which a single LMU will be developed. The initial pit and waste rock dump will be developed as shown on Plate 8A. The initial pit will be approximately 800 feet long, 600 feet wide, and 160 feet deep. The waste rock dumps will be developed adjacent to the pit on the southeast. The ore pad will be located adjacent to the pit and dump. Plate 8B illustrates the terrain as it exists today in the vicinity of the proposed Southwind Pit and Dump. An existing Juab County Class D road will be upgraded to a Class B road to serve as an ore haul road. This road currently extends northward from the main mine access road (a Class B Juab County Road), located to the south of the Monitor pit following the border of T. 13 S., R. 12 W. and T. 13 S., R. 13 W. to the vicinity of the Southwind deposit (Plates 4A and B)).

Backfilling of the South Wind Pit is not currently anticipated. The potential exists for pit expansion in a down-dip direction in the future; therefore, backfilling cannot currently be planned In addition, the haul distance to other pits that may have backfill capacity is too great to allow economic disposal of South Wind waste rock as backfill in other pits.

5.9.4 Monitor LMU Pit 1

The initial pit in the proposed mining phase will be designated LMU Pit 1. It is located as shown on Plate 9A. Ore mined from Pit 1 will be hauled to the existing ore pad by way of an upgraded haul road consisting of existing mining spurs and the Juab County road. An existing extension of this haul road will be used to haul waste rock to the northeast end of the existing Monitor #3 pit, located approximately 3000 feet to the northeast, where it will be used as backfill.

The terrain as it exists today in the vicinity of the proposed LMU Pit 1 is illustrated on Plate 9B.

5.9.5 Fluro LMU Pits 3

The Fluro LMU Pits 3 will expand the Fluro LMU Pits 2 and 3 to the west, as shown on Plate 10. Waste rock mined from this pit will be used to continue to backfill the existing Fluro pit, extending the backfill to the east (Plate 10). Plate 6C is an illustration with photographs showing current views of the Fluro LMU pit locations and the existing waste rock dump located to the north and northeast of the proposed pits.

6.0 ENVIRONMENTAL IMPACT ASSESSMENT

6.1 Topography

6.1.1 Current Conditions

The topography in the vicinity of the proposed open pits consists of low hills and gently west-sloping alluvial plain surfaces. Past mining activities have created open pits and overburden piles. Existing open pits have either been backfilled to the approximate elevation of surrounding terrain or remain open pending future use as access for underground mining or backfill repositories for overburden. Variances for pit backfilling or highwall regrading (R647-4-111.7) have been granted by DOGM and remain in effect.

Waste rock not used as open pit backfill has been placed in overburden piles adjacent to the open pits. Overburden pile outslopes have been maintained at angle of repose, as approved by DOGM under variance from R647-4-111.6. Overburden pile outslopes, though somewhat steeper than adjacent natural terrain, generally blend visually with the existing terrain.

6.1.2 Proposed Conditions

Although the proposed mining operations will be conducted using essentially the same mining methods currently in use, the new focus on mining multiple LMUs concurrently and the increase in proven and potential ore reserves will eventually result in larger open pits and correspondingly larger overburden piles. The need to provide variability in ore feed to the Delta mill has lead to development of the multiple-LMU approach to mining and the need to access ore from multiple individual deposits over short to moderate time periods. As a result, it is necessary that pit backfilling be approached differently than in the past. The mine-and-backfill approach formerly used extensively at the mine has necessarily been modified and, although backfilling remains a key part of BRI's overburden disposal plans, placement of a greater proportion of waste rock into overburden piles than as pit backfill is necessary for the new mine plan.

Pit backfills will continue to be constructed to blend with surrounding natural terrain or overburden piles. Placement of all waste rock into overburden piles immediately adjacent to open pits is no longer feasible in terms of both available space and a responsible reclamation approach. Instead, future overburden disposal pile locations have been established as canyon fills to the maximum extent possible, resulting in a reduced ratio of outslope area to waste rock volume. In addition, a number of other reclamation measures will minimize the visual impact of the reclaimed terrain: overburden piles will be constructed so that the outer margins have an irregular footprint to emulate the natural terrain; waste rock will be placed so that the end result will be outslopes with a terraced appearance; and, topsoil available for spreading on dump outslopes will be selectively placed to modify the slope appearances when viewed from a distance and further emulate the appearance of the surrounding natural terrain.

The canyon-fill approach to waste rock placement yields several post-reclamation, terrain-related benefits, which include the following: lesser relative outslope length compared to dump volume; a better visual terrain blend; and less visibility of waste rock from adjacent public lands to the west.

6.2 Air Quality

6.2.1 Current Conditions

Emissions at the mine come from two sources: combustion of diesel fuel by both electrical generators and mobile equipment, and dust emissions associated with overburden stripping, drilling and blasting, ore and waste rock haulage to stockpiles and overburden piles or pit backfills, grading of roads and overburden piles, and stockpile management, including blending and loading. Emissions consist particulate matter, sulfur oxides (SO_x), nitrogen oxides (NO_x), carbon monoxide (CO), hydrocarbons (HC), and aldehydes, which are documented in an inventory of all emissions sources annually. This inventory is submitted to the Utah Division of Air Quality in accordance with the Utah Clean Air Act and the federal Clean Air Act. All of these emissions are limited by using Best Management Practices (BMPs), which include all legally mandated on-board emission controls, and dust suppression by water sprays and/or chemical means on roads, overburden stockpile surfaces, and in any other work areas where dust would be generated.

6.2.2 Proposed Conditions

Sources of emissions and types of emissions would remain the same under proposed conditions as they are under current conditions. Annual emissions vary depending on the quantity of ore produced. Accordingly, emissions from the new mining operations will be affected not so much by the changes in mining approach, but more so by the quantity of ore mined each year. Average annual emission rates under the proposed mining plan may be less than the average emissions in past years when large contract stripping projects were completed in a one or two-year period.

Existing BMPs would remain in use initially under the proposed mining operations. As mining equipment and emission control technology are changed in the future, management practices would be modified as necessary so that BMPs are always in place.

6.3 Land Use

6.3.1 Current Conditions

Land ownership at the mine has recently changed from public to private as the result of the Utah West Desert Land Exchange Act of 2000 and a subsequent agreement between the Company and the Utah State Trust Lands Administration (TLA). As shown on Figure 1 and discussed in section 2.2, the land surface in the mine area is now privately owned by BRI. Land use on the mine property has not changed as the result of this change in ownership; mining, wildlife habitat, and livestock grazing remain the dominant land uses. Livestock grazing on BRI property is now controlled by BRI through an internal grazing permit process. Rockhounding and other recreational pursuits are not permitted on the Company's Topaz Mining property.

6.3.2 Proposed Conditions

The proposed changes in mining approach will result in greater overall mining-related land use and an increase in overall disturbed acreage. No change in land ownership is contemplated or expected through the life of the mine. Land uses during mining will remain unchanged with privately managed livestock grazing and wildlife habitat remaining along with mining.

The planned post-mining land use is wildlife habitat and livestock grazing. The mine property may also attract recreational land users (e.g., rock hounding); however, the property will be posted and, when all mining and reclamation have been completed, may be fenced if necessary for safety purposes. Public recreation will not be a land use authorized by BRI.

6.4 Surface Water Hydrology

6.4.1 Current Conditions

Currently, precipitation falling within pit boundaries and immediately adjacent, minor, up-gradient runoff accumulates in various open pits. The volume of water that accumulates is dependent upon rainfall amounts, evaporation rates, and pit floor characteristics. In all cases, however, the capacity of the pits is well in excess of any combination of precipitation and evaporation that would be expected under the most conservative of assumptions, ensuring that discharge out of the pits does not occur. Further, the accumulated water has been determined to be of good quality; some is pumped and used for dust control and area wildlife and livestock use the water that remains in the pits.

The majority of the precipitation falling on the mine area and its up-gradient watersheds is currently collected behind existing large overburden dumps built across these watersheds throughout the mine property. Down gradient of the mine area, and at a distance across the alluvial valley, Fish Springs Wash flows northward. Under natural, pre-mining conditions, there was likely little surface connection between the upgradient channels and Fish Springs Wash, due to infiltration through channel beds into the alluvium. United States Geological Survey (USGS) topographic mapping shows no surface connections between the outfall tributaries and Fish Springs Wash. Instead, runoff served to provide recharge to whatever alluvial aquifer may be associated with Fish Springs Wash. Previous and existing mine operations have not substantively changed this scenario; most runoff is intercepted behind overburden dumps where it evaporates or infiltrates.[3]

6.4.2 Proposed Conditions

Under the proposed mining plan, storm water will continue to be managed as it has been in the past. Most upgradient runoff will be kept out of active pit boundaries, but some minor impoundment of runoff from small, local upgradient areas, as well as

[3]During a major intense storm event in August 2002, water accumulated to a depth of approximately 8 to10 feet behind the large overburden dump adjacent to the existing Rainbow pit. In a matter of no more than three days all of this water had infiltrated into either the channel bed or the overburden itself. No flow occurred in the channel downstream of the dump as a result of this event.

precipitation falling within pit boundaries themselves, will continue to occur. Several existing overburden dump footprints will be enlarged, and new overburden dumps will be created. They will intercept runoff from various sources, including: up-gradient, undisturbed watersheds draining Spor Mountain and the Thomas Range; local undisturbed range-front areas within the mine property; existing disturbed areas related to ongoing mining activities; and previously reclaimed mine areas that have been released from bonding. In addition, backfilling of several existing pits will occur, and reclamation of completed mine areas will be ongoing.

The proposed mine plan will result in a greater volume of waste rock being stored in overburden piles than was contemplated under the current mine plan. The plan for placement of waste rock in existing drainages will result in partial filling of drainages and resultant reduction in drainage area, since the waste rock is known to be highly permeable and runoff from waste rock piles is known to not typically occur. In addition, the overburden will provide increased capacity for temporary storage of runoff that first accumulates behind waste rock dumps and then quickly subsides and infiltrates. Accordingly, the amount of runoff leaving the proposed disturbed areas will be no greater than the volume that currently flows from the area.

6.5 Ground Water Hydrology

6.5.1 Current Conditions

None of the existing or currently proposed open pits reach the local water table. An "Assessment of Potential Impacts to Ground Water from Mining, Ore Stockpiling and Waste Rock Placement" (JBR, 1999b) was submitted to the Utah Division of Water Quality (DWQ) in 1999. A copy of this document is provided in Appendix 3. The study demonstrated the low permeability of the ore and waste tuff as well as the low concentrations of leached, dissolved constituents in the rhyolite leachate. Other considerations in the assessment included the regional low precipitation rate and high evapotranspiration rate and the natural influence of mineralization on the ground water beneath the mining properties. The natural influence of mineralization on ground water is also found to come from Spor Mountain and the Dell. The potential impact of the mining operations to ground water quality was confirmed by the DWQ to be *de minimus* and is thereby considered permitted by rule under the Utah Ground Water Quality Protection Regulations.

6.5.2 Proposed Conditions

The revised mine plans will not result in any of the proposed open pits reaching the water table. The results of the completed development drilling have demonstrated no significant differences in the geology and mineralogy of the ore and waste rock in these deposits from those understood at the time the ground water assessment was completed in 1999. Therefore, proposed revisions to the MRP will not result in any effects on ground water quality different than those identified in the 1999 ground water quality assessment.

6.6 Soils

6.6.1 Current Conditions

True topsoils are not well developed in the mine area and where present are relatively thin. Consequently, what has been salvaged as topsoil is in many cases alluvial sediment or regolith derived from the local bedrock. Initially, the Company had undertaken to recover all such material that had a soil-like texture, in accordance with the approved MRP. However, as stated above in section 4.7, although the bedrock-derived soils and even gravel deposits can serve as topsoil substitute, the Company's experience with alluvial soils has shown that salinity concentrations at salt-toxic levels can occur at relatively shallow depths. As a result, the Company has determined that salvaging more than 3 to 6 inches of alluvial soil as a revegetation medium may be detrimental to future reclamation. Most of the topsoiled areas where revegetative success has been achieved under the current plan are areas that have been topsoiled with bedrock-derived soils. Areas that have been covered with alluvial soils, particularly the Rainbow test plots, had mixed success. Results of past test plot work have shown, qualitatively, that saline soils apparently occur at relatively shallow depths in the alluvial profile in at least some areas in the overall mine area. The sediments from these salt-toxic intervals of the alluvial profiles are not soil resources; therefore, the company has determined that salvaging alluvial soils at anything greater than very shallow (3 to 6 inch) depths may not result in preservation of valuable soil resources or reduce the impact of mining activities on the environment.

6.6.2 Proposed Conditions

The current approach to topsoil or soil substitute salvaging will be followed initially under the proposed revision. The topsoil assessment program (section 5.6) may result in changes in the approach to soil salvaging as information on soil fertility and/or toxicity is gathered. All true topsoil in salvageable thicknesses will be recovered from future disturbed areas; the salvageable thickness over the entire mine property is estimated to be 3 to 4.5 inches, nominal. The salvageable thickness of alluvial soils is estimated to be 6 to 12 inches or 9 inches, nominal.

6.7 Vegetation

6.7.1 Current Conditions

Vegetation at the mine site currently consists of undisturbed native vegetation and reclamation vegetation in areas disturbed by the company's and past operator's mining operations. The plant types in the latter category are comprised of native species or other species approved for revegetation by the Division in the past. In addition to the native and other approved plant species, tamarisk, an invader species, is present in the inactive, older open pits adjacent to collected meteoric water. BLM has identified the noxious weed squarose knapweed on roads and trails in the Topaz Mountain area (JBR, 1999); however, this weed is not known to be present in the vicinity of the current disturbances.

Many of the disturbed areas have been granted variances from revegetation requirements by the Division. Areas for which revegetation is not required include older tuff-covered dumps, open pit walls and floors, and waste rock dump outslopes. Revegetated areas are in various stages of post-reclamation monitoring and some of the areas have been released from further reclamation obligations. The current state of reclamation of existing mine-related disturbances at the mine is summarized in section 9.1 of this document.

No known special status plant species have been expected to be affected by the proposed operations (JBR, 1999a).

6.7.2 Proposed Conditions

Native, previously undisturbed vegetation and, locally, vegetation that has resulted from past revegetation efforts will be disturbed throughout the life of the proposed mine operation. The total area of previously undisturbed or partially disturbed vegetation to be disturbed during mining of the initial LMUs is approximately 91 acres. This value was calculated by subtracting previously disturbed areas from the total area to be disturbed in the Phase I development areas. The life-of-mine disturbance of currently vegetated lands will be an estimated 1759 acres, based on present estimates. This area was calculated using the methodology described above for the Phase I development.

The temporary disturbance on both previously disturbed and undisturbed areas would occur until reclamation is completed and vegetation is reestablished. Areas that will not be revegetated include un-backfilled open pits, waste rock dump outslopes, county roads, and previously disturbed areas that have been released under variance conditions.

The redistributed soil and overburden would have different growth medium characteristics than the undisturbed soils; however, past reclamation success has demonstrated that the substitute soils support native vegetation.

The approved seed mix in section 7.9 and necessary and proven beneficial soil augmentation would continue to be used for revegetation efforts. All revegetation seed mixes would be guaranteed weed free. In addition, the Company would conduct routine monitoring, so that early detection of noxious weeds would be accomplished and appropriate control measures could be implemented.

6.8 Wildlife

6.8.1 Current Conditions

Some wildlife has undoubtedly been displaced by the on-going mining activity along with the resultant loss of habitat for some species. Loss of habitat has eliminated some forage opportunities; however, because the project area and vicinity have been under continual relatively slow development for more than 30 years, displacement of wildlife has likely been minimal (JBR, 1999).

No animal species afforded protection under the Endangered Species Act of 1973 (as amended) are known to reside in the project area. However, bald eagles (threatened) may occasionally occur in the project area as periodic migrants. Although the peregrine falcon (formerly endangered, but de-listed from the Endangered Species Act in August 1999) is known to nest in Juab County, no known nests occur within 50 miles of the project area. In addition, no state sensitive animal species are known to be residents within the project area (JBR, 1999).

6.8.2 Proposed Conditions

Wildlife and wildlife habitat effects under the proposed conditions would remain as they have been since mine development began. Habitat loss and wildlife displacement will continue to occur and reclamation will continue to restore habitat throughout the proposed mine life.

6.9 Archeological & Paleontological Resources

6.9.1 Current Conditions

Archeological sites eligible for inclusion on the NRHP that were found by past surveys have been recorded. Sites that were to be disturbed by mining activity were excavated with artifact recovery. One site, designated 42JB721 is located on former federal land in Section 9, T 13 S, R 12 W. The site was found as part of a comprehensive Class III cultural resources inventory associated with the last MRP amendment and the 1999 Environmental Assessment. The eastern boundary of site 42JB721 is greater than 350 feet west of an existing overburden stockpile. The eligible site was to be avoided by the Company, with a 50 ft buffer zone on each eligible site perimeter, as recommended by the House Range RA BLM archaeologist. This site has been avoided by the Company and current mine plans do not anticipate disturbing the site. Although, the site remains eligible for listing on the NRHP, BRI has no intention, as the surface land owner, to pursue such a listing.

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A review of the records of the State Paleontologist in the Utah Geological Survey in 1999 demonstrated that no paleontological resources were known to occur in the mine vicinity (JBR, 1999a).

6.9.2 Proposed Conditions

As discussed in section 3.10, the Company, in accordance with its agreement with the Utah TLA must obtain from the SHPO a written determination "that no archeological or paleontological resources are present at the site of the proposed disturbance" for those surface lands that were formerly owned by the State of Utah. In order for the SHPO to make such a determination, Class III archeological inventories must be completed by a state-permitted archeologist and the inventory reports approved by SHPO.

Like archeological resources assessments, a paleontological review is only required for former TLA surface lands. The Company will conduct a paleontological review and submit the findings of such reviews at the time that each future MRP amendment notice for disturbance of former state lands is proposed and submitted to the Division.

The TLA sections for which such inventories have not been completed are described in Section 3.10. The former federal lands that are now owned in fee by the Company were transferred directly from the United States to the Company by way of mineral patent. As a result these lands are no longer subject to the requirements of the NHPA and related statutes and regulations. Accordingly, no archeological or paleontological inventories need be performed in advance of disturbance of these fee lands.

The areas to be disturbed by the first set of LMUs do not include the TLA sections and, therefore, do not require archeological inventories. Future mining of the Section 16, Sigma, and South Wind ore bodies will affect the TLA sections. The Company will see to it that the required SHPO determinations are obtained and filed with the appropriate MRP amendments when future LMU development is proposed. If mining or related cultural or paleontological resources are uncovered on the TLA lands, BWI would notify the TLA and SHPO and work in the area would halt until inspection by a professionally trained archeologist or paleontologist is conducted.

As of the date of submittal of this MRP to the Division in 2005, there is some uncertainty regarding BRI's obligations to conduct cultural resources inventories on its private lands that were not formerly owned by TLA. Most of the areas to be disturbed in the initial phase of mining have been previously inventoried for cultural resources. BRI will commit to conduct any necessary supplemental cultural resources inventories on the previously un-inventoried lands that may be determined to be necessary prior to conducting its proposed mining disturbances. In addition, BRI's consultants will coordinate with the SHPO in determining the need for recording and or mitigation of any sites that may be encountered. In the event that it is determined to the satisfaction of the Division, SHPO, and BRI that, as a private landowner, BRI has no obligation to perform cultural resources inventories or site recordation, then BRI will consider the commitment to do so expressed above to be rescinded.

BRI recognizes that in the event that cultural or paleontological resources are uncovered as part of its operations, BRI is required to immediately cease working in the area of the discovery and notify SHPO. SHPO would then determine the need for mitigation, which would be carried out prior to proceeding with operations in the vicinity of the discovery.

6.10 Pubic Access & Safety

6.10.1 Current Conditions

The general mine area is currently accessible to the public via pre-existing county roads that traverse the property. Signs warning the public to stay on the public roads and warning of mining activities in the area are posted at the public access ways to the mine property. Signs also require any visitors to register at the mine office. No unescorted access is granted in either existing or proposed mining areas. Livestock grazing is permitted in undisturbed and revegetated areas in accordance with the terms and conditions of grazing permits issued by the company. Rockhounding and other recreational activities are not allowed on Company property.

The mine staff is onsite 10 hours per day Monday through Thursday beginning at 7:00 AM. During non-working hours, a watchman is on site at all times. The watch staff patrols the mine site during non-operating hours and by the mine staff during normal working hours. Patrols cover both the roads and mining areas to insure that visitors are not astray. Any evidence of off road travel or other trespass (e.g., fresh vehicle tracks, etc.) is investigated when it is identified. In the event of blasting operations, manned traffic control is placed on the roads and warning horns are sounded prior to any detonations.

The mine office is equipped with telecommunications and company vehicles are equipped with radios, in the event that emergency assistance is required and must be called.

Safety is provided to the public in compliance with the Company's policies as well as Mine Safety and Health Administration (MSHA) rules. Warning signs regarding operations are posted throughout the property in plain view of the county roads. Safety berms and warning signs have been located above the highwalls of all open pits. The safety berms are made of large, boulder-sized waste rock and are approximately 4 feet high set back 20 feet from the highwall edge. The berms are intended to prevent vehicular access. Earthen berms are also placed across pit access/haul roads after pits are mined out or when a pit is inactive.

6.10.2 Proposed Conditions

The current prohibitions on public access to Company property and the safety measures currently in place will be continued under the proposed mining operations. In the event that mining is suspended for any reason, fulltime security coverage will be maintained by maintenance staff and watch personnel.

Upon reclamation, pit safety berms and warning signs will remain in place.

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7.0 RECLAMATION PLAN

The Company intends to complete its current reclamation obligations and the new obligations resulting from continued operations using proven successful reclamation methods and techniques either from its past experience or on-going testing and assessment of new or alternate reclamation methods.

7.1 Post-Mining Land Use

The post-mining land use is currently intended to be for wildlife habitat and, perhaps, livestock grazing. This post-mining land use is also proposed under this revised MRP. Given the exceptionally long anticipated life of the mine, alternate post-mining land uses may be considered in the future. In that event, a proposal for an amendment or revision to the MRP will be submitted to the Division for approval. Meanwhile, this reclamation plan is intended to meet the needs of the currently proposed post-mining land use.

7.2 Facilities Demolition & Disposal

Existing ancillary site facilities have been described in section 4.5. These facilities include the existing mine camps and roads, as well as the on-site sanitary landfill, described in section 4.6. The very long expected mine life suggests that maintenance alone may not be sufficient to ensure that the necessary support facilities for the mine can be sustained. In some cases the facilities will need to be replaced with new ones. It is currently assumed that any such replacement facilities will have the same function and configuration as the current facilities and that no significant changes to their demolition and disposal would be required. In the event that increased support facilities are required at some future time, necessary revisions to the MRP would be made by way of a plan amendment or revision, as appropriate.

Salvageable buildings, tanks, electrical generating equipment, communications systems and other stationary equipment, and mobile equipment will be sold for salvage or reuse. Concrete building foundations will be demolished and disposed of in the on-site landfill, which is approved for disposal of demolition and construction debris. Portable buildings (e.g., office trailers) that cannot be salvaged will be demolished on site and disposed of in the on site landfill. Prior to removal from the site for salvage or re-use, the contents of all tanks will either be consumed or disposed of properly. Electrical generating equipment, communications equipment (e.g., repeaters), other stationary equipment, and mobile equipment will be sold for reuse or for scrap. Under no circumstances will these types of equipment or related parts or components (e.g., tires) be disposed of in the on-site landfill or elsewhere on the mine property.

7.3 Roads

As described in Section 4.5, there will be two major categories of roads remaining on the property after completion of mining operations: roads constructed solely for the purpose of mining operations and those roads that were pre-existing county roads. Roads constructed for the purpose of supporting mining operations include waste rock and ore haul roads and roads dedicated to accessing support facilities. Other mining-related roads will be confined to areas that will be disturbed by later, larger-scale mining activities, such as waste rock dumps and open pits. As a result, the disturbances associated with these roads will not exist at the time reclamation of the coincident disturbed areas will begin.

Mining-related roads will be reclaimed by ripping the compacted surfaces to an approximate depth of 18 inches with the rip path spaced approximately 36 inches apart, placing 3 to 6 inches of topsoil over the de-compacted surface, seeding with the approved reclamation seed mix, and then treatment with the sheepsfoot compactor.

Roads that are determined to be established county roads under the jurisdiction of Juab County will either remain in place or be relocated to facilitate ongoing road use during and after mining activities. Roads that will remain in their current locations will be left in a condition equivalent or restored to the original, pre-mining road condition or to an alternate condition established by BRI in concert with Juab County officials. County roads that are relocated will be re-established to meet the road conditions required by Juab County for the appropriate road class. Former county roads that are permanently closed will be reclaimed. All of these roads are on fee surface lands owned by BRI; therefore, no approvals from other land management agencies are required.

7.4 Regrading & Recontouring

7.4.1 Open Pits

Selected open pits will be backfilled, resulting in partial or complete elimination of some open pit highwalls. No other highwall slope reduction is proposed. During BRI's nearly 40 years of mining operations no pit highwall stability-related safety issues or accidents have occurred. BRI's ongoing focus on miner safety and improved pit designs has identified the causes of the minor highwall failures that have taken place and resulted in design changes that overcome these failures in the future. Further details related to pit highwall stability may be found in Section 8.2, wherein a variance from rule R647-4-111.7 is requested.

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7.4.2 Waste Rock Dumps and Pit Backfills

Waste rock dumps, including pit backfills that result in fill elevations above the pit surface will be re-contoured by dump- top rounding and surface recontouring. Dump-top rounding reduces the visual sharpness of the dump crest, resulting in better blending with neighboring terrain. In addition, the former practice of placing runoff control berms on the dump-top margins has been eliminated. As a result, accumulation of runoff on the dump top, which in the past has lead to rapid erosion events on the dump outslopes (blow-outs) and consequential rilling and gullying, is much less likely to occur.

Surface contouring of dump tops consists of subtle re-contouring to create an undulating, as opposed to flat, dump surface. This is accomplished by selected placement of final loads of non-tuffaceous overburden on dump surfaces (plug dumping) followed by smoothing with a dozer prior to topsoil placement. This surface recontouring helps the reclaimed dump surfaces to blend visually with the surrounding terrain by eliminating the highly visible horizontal surfaces that characterize waste rock dump surfaces that are not re-contoured.

The Company's experience in developing and reclaiming waste rock dumps over the last 20 years has shown that waste rock outslopes placed at the natural angle of repose result in a stable configuration and present little safety hazard. A request for a variance from rule R647-4-111.6 is presented in section 8.1.

When available, salvaged topsoils will be pushed over the dump outslopes from the dump-top margins. In addition to serving as a revegetation medium, the placement of soil on the dump outslopes has the effect of "softening" the visual appearance of the outslopes when viewed from a distance, resulting in a slope that blends into the terrain more so than do the coarser, lighter-colored rhyolite-covered outslopes.

7.4.3 Mine Camp, Landfill, Topsoil and Ore Stockpiles, and Related Facilities

Minimal regrading is expected to be required for these facilities and components. After all facilities are removed, remaining cut-and-fill excavations, if any, will be regraded to blend with the adjacent terrain. Such cuts/fills will be of small amplitude and any regrading conducted will result in low-angle, stable slopes.

The landfill is located on a previously varianced portion of the Roadside Fluro mine waste rock dump (Plates 4, 5, and 11). It will be reclaimed after mining has been completed at the property. During the final phase of development of the Roadside Fluro pit and dump complex, appropriate quantities of waste rock for cover material and soil growth medium recovered during this development will be stockpiled adjacent to the landfill for use in landfill reclamation. The initial step in landfill closure/reclamation will be grading the area of the landfill to blend with the surrounding dump surface. Then the landfill surface will be covered with at least two feet of waste rock followed by a six-inch soil layer. Revegetation and related reclamation steps will conform to the reclamation performed on the surrounding waste rock dump.

After stockpiled topsoil has been replaced during reclamation, topsoil stockpile sites will be ripped to a depth of approximately 12 inches and seeded using the standard reclamation seed mix

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7.5 Drainage & Sediment Control

Refer to the discussion of drainage and sediment control in sections 3.6, 4.8, 5.7, and 6.4.

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7.6 Test Plot and Past Reclamation Results & Implications for Revegetation

7.6.1 Summary of Results

Documentation of BRI's test plot program began in 1992. Since that time, BRI has prepared and submitted summary annual reports to the Division that have described reclamation activities and notable test plot results during each year. Appendix 4 contains a Summary of Annual Reports to DOGM, prepared by BRI in 2003. The information in this summary reflects the experimental approach taken in the test plot program and in some of the reclamation efforts. Early during the reporting period (1992 – 1995) inorganic fertilizer, variously described as mono-ammonium phosphate (16-20-0) or simply "fertilizer" was used. The 1993 annual report states that the mono-ammonium phosphate was a "big player in getting young plants established." This report further stated that a combination of super-phosphate, urea, gypsum, and mulch produced no better results in test plots than did the mono-ammonium phosphate. Subsequently in 1994 and 1995 topsoil, straw, gypsum, seed mix plus or minus manure and inorganic fertilizers were applied.

In 1995, BRI began assessing the usefulness of adding manure to the soil amendment mix. The so-called "holistic" approach to soil amendment – using livestock to produce manure on site and then to mix it with the surficial soil (a.k.a. "stomp and poop") was attempted in 1996. Composted manure, acquired for only the cost of transportation, was first applied as a soil amendment in 1997 in dump reclamation adjacent to the Monitor pit. Composted manure (720 CY) was mixed with topsoil (almost 30,000 CY) before topsoil redistribution. In addition, "ammonium sulfate (20-0-0), triple phosphate, and gypsum" were also used as soil amendments. A sheepsfoot compactor was first used in final reclamation during 1997.

In 1999, test plots at the Rainbow #1 dump evaluated alluvial materials as a substitute growth medium (there were no notable reclamation activities in 1998).

The annual report for the year 2000 reported good reclamation success on the Monitor dump (seeded in 1997) and at Blue Chalk. The results of the Rainbow #1 test plot work begun the previous year were reported. A simple mixture of gravel soils and manure at ratio of approximately 15:1 was reported to have yielded results superior to test plots amended with gypsum or organic fertilizer alone.

In 2001, reclamation of 10 acres in the vicinity of the Roadside ore pad was carried out as a voluntary effort at this previously released (1996) area. Alluvial soils recovered from the alluvium stripping at the Rainbow #2 pit area were blended with manure at a ratio of approximately 10:1 and then placed on the ore pad site. In addition to manure, the gravel/manure blend was treated with 11-52-0 inorganic fertilizer and gypsum at the rates of 170 and 380 pounds/acre, respectively. No notable results were described for 2002.

7.6.2 Implications for Use of Soil Amendments to Enhance Revegetation Success

The documented past reclamation efforts describe a series of both test-plot and field-scale revegetative tests. Collectively these results suggest that a variety of soil amendments have contributed to past revegetative success. Anecdotal information provided by current and former BRI staff also brings further perspective to the effectiveness of past soil amendment efforts:

- ✓ Although inorganic fertilizers are believed to have contributed to past revegetative success, nitrogen, possibly with a moderate amount of phosphate, appears to have been most effective. Potassium was believed to be an unnecessary additive and perhaps a counterproductive one given the naturally high soil salinities.
- ✓ Observations of test plots and reclaimed areas treated with composted manure have identified what may be excessively high quantities of cheat grass in the subsequent vegetation. These observations have suggested that composted manure may have introduced cheat grass seed to these areas or that the presence of the composted manure facilitated preferential germination of cheat grass over native grasses and forbs.

- ✓ Other observations have suggested that composted manure was instrumental in improved vegetative success.
- ✓ The mulching effect of gravel in alluvial soils appears to have been beneficial to germination and seedling success.

7.6.3 Observations Regarding Vegetative Success

- ✓ Shadscale, four-wing saltbush, and Indian rice grass appear to be the most successful individual plant types.
- ✓ The use of a sheepsfoot compactor to "dimple" the surface after seeding and to press the seed into the soil surface was found to be effective in enhancing revegetative success. The depressions that are created collect and concentrate precipitation, creating preferential germination sites. In addition, seeds pressed into the soil surface, having reduced exposure to wind and wildlife, are believed to have better opportunities to germinate.

The ability to assess the relative success of past soil amendment efforts is limited by documentation of vegetative success subsequent to the various, different approaches. In addition, almost no data on soil quality has been collected. This overall lack of quantitative information for past reclamation activities prevents an objective assessment of the effectiveness of these efforts. For these reasons, BRI intends to conduct a systematic, quantitative assessment of future revegetative success using both soil analysis and quantitative vegetative monitoring. Accordingly, the soil amendment program described in section 7.9 is flexible.

7.7 Soils Redistribution and Seedbed Preparation

Stockpiled topsoil will be replaced in layers of three to six inches. In most cases, scrapers will be used to place the topsoil; however, haul trucks may be used in some cases, as appropriate. After topsoil placement, compacted surfaces will be ripped to an approximate depth of 18 inches with the rip path spaced approximately 36 inches apart. This creates a deep seedbed and causes the topsoil to filter into the underlying, ripped material.

7.8 Topsoil Availability

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BRI plans to use currently stockpiled topsoil first for reclamation at the Fluro, Rainbow, and Monitor Phase I LMU developments. Current stockpiled topsoil totals approximately 39,700 cubic yards divided among four separate stockpiles. Approximately 10,800 cubic yards are located in two stockpiles of 500 and 10,300 cubic yards located at the Roadside Fluro and Blue Chalk areas, respectively. This topsoil is located sufficiently close to the Fluro and Rainbow Phase I LMU developments to enable these soils to be used for reclamation at these two areas. The remainder of the currently stockpiled topsoil is located in the Monitor area and will remain in stockpile until subsequent phases of mine development because no reclamation will occur at Monitor during LMU Phase I.

As described in Table 5.6-1, total topsoil to be salvaged during LMU Phase I is estimated to be approximately 48,082 cubic yards. Of course, all salvageable topsoil of suitable quality will be will be recovered; the estimated recoverable soil volumes shown in Table 5.6-1 are somewhat conservative.

7.9 LMU Phase I Topsoil Demand and Topsoil Balance

The demand for topsoil created by LMU Phase I disturbance is shown in Table 7.9-1. For estimating purposes, the minimal topsoil replacement thickness of three inches was assumed for assessing topsoil demand. For information purposes, the topsoil demand is differentiated between the quantity needed for reclamation of the entire LMU Phase I disturbance and the amount required for reclamation planned for completion in during LMU Phase I.

Table 7.9-1 Topsoil Demand

LMU Name	Maximum Topsoil Demand				Phase I Reclamation Soil Needs		Remarks
	Dump/Backfill Surface		Dump Outslope		Soil Demand ($yd.^3$)*		
	Acres	Soil Demand ($yd.^3$)	Acres	Soil Demand ($yd.^3$)*	Surface	Outslope	
Fluro 1	6.1	2,471	5.5	2,725	2,471	0	see (1)
Fluro 2	3.3	1,332	6.9	5,111	1,332	0	see (1)
Fluro 3	2.8	1,144	7.6	5,585	1,144	0	see (1)

LMU Name	Maximum Topsoil Demand				Phase I Reclamation Soil Needs		Remarks
	Dump/Backfill Surface		Dump Outslope				
	Acres	Soil Demand (yd.^{3})	Acres	Soil Demand (yd.^{3})*	Soil Demand (yd.^{3})* Surface Outslope		
Rainbow 1	12.8	5,153	4.0	2,919	5,153	3865	see (2)
Rainbow 2	24.3	9,798	0.0	0	9,798	0	see (3)
Rainbow 3	19.9	8,023	1.8	1,297	8,023	649	see (4)
Monitor 1	3.7	1,475	3.3	2,422	0	0	see (5)
South Wind 1	10.9	4,380	6.5	4,825	0	0	see (5)
Totals	83.7	33,777	35.5	24,884	27,922	4,514	
Maximum Phase I Topsoil Demand	58,661						
Phase I Soil Demand					32,436		

* corrected for slope

Notes:

(1) LMU dump to ultimate height - No sideslope treatment in Phase 1

(2) LMU dump to ultimate height - 3/4 sideslope treatment in Phase 1

(3) LMU dump to ultimate height - Canyon fill (NO sideslope)

(4) LMU dump to ultimate height - 1/2 sideslope treatment in Phase 1

(5) LMU dump not to ultimate height - NO treatment in Phase 1

The estimated volume of soil to be recovered from the Phase I LMU areas, 48,082 cubic yards (Table 5.6-1), exceeds the volume required to cover the dump surfaces that will be re-topsoiled as part of Phase I concurrent reclamation, which requires approximately 32,400 cubic yards. The reclamation plan calls for placement of salvaged soil on dump outslopes if soil is available. After determining the actual volume of topsoil salvaged during Phase I, BRI will determine whether to place topsoil on dump outslopes following the Rainbow 1 and Rainbow 3 developments or to retain the topsoil not needed for dump-top reclamation for use in reclaiming Phase I disturbances that are to be reclaimed in subsequent mining phases.

7.10 Revegetation

BRI's experience has shown that broadcast seeding, either by hand or by using a fixed-wing aircraft yields the best results in terms of coverage and germination. The reclamation seed mix shown below in Table 7.10.1 will, upon approval by the Division, be used in all revegetation efforts. Seed will be applied in the late fall or early winter of the season in which reclamation is conducted.

Table 7.10-1 Reclamation Seed Mix and Application Rate

Scientific Name	Common Name	Pounds/Acre
Agropyron cristatum	crested wheatgrass	3.0
Sitanion hystrix	Squirreltail	2.0
Oryzopsis hymenoides	Indian Ricegrass	2.0
Melilotus officinalis	Yellow Sweetclover	0.5
Artemesia nova	Black Sage	0.1
Penstemon palmeri	Palmer's Penstemon	1.0
Atriplex canescens	Four-wing Saltbush	1.0
Atriplex concertifolia	Shadscale	1.0
Total		10.6

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Green rabbitbrush (*Chrysothamnus viscidiflorus*) has been eliminated from the proposed seed mix. BRI had in the past been advised by BLM to eliminate rabbitbrush from the reclamation seed mix, but did not pursue doing so with the Division. The large size of rabbitbrush seed creates problems in seed application including plugging of seeding equipment and contributing to uneven seed distribution. Rabbitbrush is abundant in the area; therefore, there is an abundant source of volunteer seed. BRI proposes to eliminate rabbitbrush seed from the seed mix and rely upon volunteer revegetation along with supplemental applications to re-establish rabbitbrush in reclaimed areas.

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BRI's future soil testing program is intended to provide data on soil nutrients so that the soil amendment program can be optimized to ensure that the most appropriate types and application rates of inorganic additives are used. Until this data has been collected and compiled, BRI will use one or more of the soil amendments and application rates shown in Table 7.10.2, which are based upon past experience.

Table 7.10-2 Soil Amendments and Application Rates

Amendment Type	Application Rate	Purposes
Inorganic Mulch (gravel mulch)	N/A	Aid in moisture collection and retention Stabilize soil surface
Organic Mulch Alternative straw or hay or composted manure	2 tons per acre 10 tons per acre	Reduce soil compaction Enhance microbial processes Aid in moisture retention

Amendment Type	Application Rate	Purposes
Mono-ammonium phosphate (16-20-0)	150 pounds per acre	Nutrients
Gypsum ($CaSO_4*H_2O$	350 pounds per acre	Sodium demobilization (for areas where soil salinity is known to be a problem)

Recent experience at the mine has shown that the use of gravelly alluvial soils have promise as soils with the texture necessary to support germination and growth of native vegetation. The increasing purchase cost of composted manure, along with storage, maintenance, and pest control (e.g., flies) difficulties and costs, combined with the apparent mixed success experienced with its use as a mulch, places the cost benefit of this soil amendment in question. BRI's enhanced vegetative monitoring effort will attempt to better assess the value of various types of mulch, as well as of inorganic nutrients and additives. However, as previously discussed, moisture conditions in the shallow soils, controlled by frequency, seasonal distribution, and duration of rainfall events and winter snowfall, will undoubtedly overprint the individual effects of soil additives on plant germination and growth in many instances.

7.11 Reclamation Sequence & Schedule

7.11.1 Initial LMUs

The anticipated sequence of pit development for the initial LMUs is shown in Table 5.1-1 and discussed in more detail section 5.9. Waste rock dumps and backfills have been designed to allow reclamation to occur as soon after waste rock placement as possible. The expanded use of valley-fill dumps combined with pit backfilling minimizes the need for creating stacked, multiple-lift dumps that could not be reclaimed during the mining of the initial LMUs.

Reclamation treatments maps for each LMU to be developed during Phase I LMU production may be found on Plates 6A to 10. They depict the individual pit developments and the reclamation treatments to be applied at each stage of pit, dump, and backfill development during Phase I. The individual reclamation treatments and the reasons for their use have been described in preceding parts of Section 7. Proposed specific reclamation treatments for each disturbance type (e.g., dump & pit backfill surfaces, roads, etc.) are shown in a standard explanation format on each reclamation treatments map (Plates 6A – 10). This standard explanation format is reproduced below in Table 7.11-1.

Table 7.11-1 Reclamation Treatments Explanation Matrix

Reclamation Treatments	Area to be Reclaimed						
	Dump & Pit Backfill Surfaces	Dumptop Margin	Dump Outslopes	Ore Stockpile Pads	Roads	Mine Camp & Ancillary Facilities	Topsoil Stockpile
Shallow Surface Rip							√
Deep Surface Rip	√			√	√	√	
Rounding with Dozer		√					
Surface Contouring	√						
Place 3 to 6 inches soil/substitute	√			√	**	√	
Sidecast Topsoil from Dumptop			√ *				
Mulch	√			√		√	
Reclamation Seed Mix	√		√	√	√	√	√
Final Surface Treatment ***	√			√	√	√	
Treatment Components	Σ √	Σ √	Σ √*	Σ √	Σ **, √	Σ √	Σ √
Treatment Type	A	B	C	D	E	F	G

*If available after other higher priority demands are first met.

**If necessary (roads built of local alluvial gravels may not require topsoil)

***Surface will be "dimpled" using a sheepsfoot compactor

The reclamation treatments marked with a "check" (√) mark under each disturbance type in Table 7.10-1 are those that would typically be applied in all cases. An exception is dump outslope reclamation, which would only take place if a dump's (or pit backfill's) final or ultimate outslope had been placed during Phase I LMU development. This is the case for most but not all waste rock slopes in the initial LMUs. The reclamation treatments maps (Plates 6A to 10) show all the specific reclamation treatments to be applied in each LMU during Phase I.

7.11.2 Overall Mine Development

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The schedule for development beyond the additional LMUs is dependent on economic and metallurgical factors that cannot be assessed at this time, as discussed in Section 5.1. Currently, the sequential pit development and reclamation treatments approach planned for Phase I LMU production is anticipated to be followed in future phases of mine development.

Plates 11A and 11B depict the currently anticipated post-mining topography at the Topaz mining properties. These maps also show open pit areas that are anticipated to have been backfilled at the end of mine life. The appropriate reclamation treatments will be applied to the final dump and pit-backfill surfaces, waste rock pile outslopes, ore stockpiles sites, topsoil stockpile sites, roads and the mine camp. These treatments are currently anticipated to be those previously described in this section; however, reclamation treatments will be altered if on-going reclamation experience or technological improvements indicate that better and more cost-effective approaches are more appropriate. Any such change in reclamation treatments will be presented for the Division's approval in a request for an MRP amendment.

The on-site landfill is adjacent to existing waste rock dumps. Upon final reclamation or closure of the landfill, whichever occurs first, BRI will cover the landfill with five or more feet of rhyolite waste rock before replacing topsoil. Accordingly, the standard reclamation seed mix will be used for the landfill reclamation.

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Each subsequent mining phase will be presented to the Division as an MRP amendment request. If the proposed mine footprint, mining or reclamation methods were to change significantly from those currently anticipated, an MRP amendment or revision, as appropriate, would be sought. All subsequent phases would be planned to enable the greatest amount of concurrent reclamation possible while maintaining cost-effective mining methods and development sequences.

Most county road locations shown on these maps are those that exist today and are shown for reference purposes only. Those roads that are in areas proposed for future mining will be closed and/or relocated in accordance with the agreement between Juab County and BRI (refer to section 7.3). That agreement requires that planning for road closures and realignments be done when specific development plans are in place. As a result, road closures and realignments that occur following Phase I LMU development will be established and agreed upon when detailed plans for subsequent mining phases have been developed.

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8.0 REQUESTS FOR VARIANCE

BRI requests variances from selected requirements of Rule R647-4-111, as described in the following subsections. The requested variances have been granted for the current mining and reclamation plan. BRI believes that the factors that resulted in the granting of the current variances remain fundamentally unchanged in this proposed MRP. Past revisions of the MRP have been supported by separate volumes including all correspondence between BRI, the Division, and BLM. This correspondence documents the reasoning for the granting of past variances and is included herein by reference.

8.1 Regrading of Slopes

Waste rock dump slopes are constructed in a stable configuration using coarse rhyolite waste rock. The outslopes are reclaimed in one of two ways: by pushing available topsoil over the dump outslopes from the edge of the dump surfaces and broadcast seeding using the approved seed mix; or, by direct seeding of the rocky outslopes if sufficient topsoil is not available. Experience to date at the mine has demonstrated that this approach provides for slopes with long-term stability in terms of erosion prevention. The pocketed surface of the outslopes traps either topsoil, eroded fine-grained soils and sediment, or both and provides not only a seed bed, but also a collection site for direct precipitation and the limited runoff that might take place during heavy rainfall.

There is no evidence from past practices at the mine to suggest that a reduced slope will enhance revegetation. Regrading the dump outslopes would have only adverse effects on achievement of final reclamation. Adjacent undisturbed and/or partially vegetated terrain would be covered with waste rock resulting in the loss of native vegetation in these areas and the disturbance (through removal) of established, vegetated native topsoils. In addition, this loss of vegetation would lead to loss of sources of seed for re-establishment of vegetation by volunteer means, which has been observed to have commonly occurred in the past on waste rock dump slopes. The area requiring topsoil placement would be enlarged, increasing the demand for the limited quantities of usable topsoil that are believed to be salvageable at the mine. The reduction in slope would provide no additional benefit in erosion prevention, since erosion of the coarse and durable slopes is minimal.

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8.2 Highwall Slope Angles

Past experience at the mine has demonstrated that pit highwalls are sufficiently stable to enable them to be left as constructed. Highwall safety berms are constructed of course rhyolite rock to prevent vehicular access to highwalls. Pit access roads will likewise be blocked using rock barriers and signs warning of steep slopes and rock fall hazards will be posted.

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BRI's near and long-term mining plans call for backfilling of pits whenever doing so does not inhibit future pit access or result in uneconomic waste rock haul distances; however, a fixed plan for life-of-mine backfilling cannot be developed at this time. Disposal of waste rock by backfilling existing pits is planned in four of the eight initial proposed LMUs. The need for flexibility in ore production to meet specific mill requirements will require that production occur from multiple pits over relatively short time periods; however, the individual pits will be under expansion, in operation or ready for production for many decades. As a result of the proposed multi-pit mining approach, a greater quantity of waste rock must be placed in surface-located waste rock dumps than would have occurred had the current two-pit approach been continued. Metallurgical and economic concerns no longer make this approach possible. Nevertheless, BRI believes that substantial pit backfilling will ultimately occur and for economic as well as aesthetic and environmental reasons is committed to doing so to the maximum possible extent.

As explained below, reduction of the slope of highwalls to 45 degrees or less is not necessary to provide for stable highwalls. Therefore, slope reduction would only result in increased mining costs and/or a reduction in ore recovery. In addition, highwall slope reduction would result in increased land surface disturbance and resultant impacts to vegetation and wildlife habitat.

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BRI's pit walls have been largely stable throughout its mining history. The few highwall slope failures in the past have generally occurred during mining operations. BRI's experience has been that slope failures, other than rockfalls, are confined to intrabench failures except in instances where pit walls closely parallel major faults. When pit walls approach the planes of relatively steeply dipping major normal faults tangentially, the mass of rock between the pit wall and the fault plane can become unstable and subject to relatively slow rotational failure. Two such failures have occurred in the past and have now been permanently stabilized by mining the additional waste rock generated by the slump in one case and by ceasing operations in the part of the pit impacted by the slump in the other case. Since these slope failures, BRI has advanced its mine planning capability. All deposits have been thoroughly assessed through drilling and all faults have been identified. Mine planning for the Phase I LMUs has taken into account the risks of pit wall/fault plane failures. Pits have been designed to avoid leaving waste between pit walls and fault planes. This is normally accomplished by designing the pit wall adjacent to major faults to cross the fault plane. As a result, the portion of the pit wall above the fault plane is comprised entirely of the rocks on the footwall side of the fault and is not subject to fault-related highwall failure. That part of the pit wall in the hanging wall of the fault has much less mass and is lower in height than footwall-located highwalls with which past failures have been associated. As a result, rotational failures no longer occur.

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The slopes for existing pit highwalls are summarized on a table and map in Appendix 6. These data show that of eight existing open pits, four have slopes of 45 degrees or less and the other four have average highwall slopes ranging from 47 to 53 degrees. The designed slopes for the new Phase I open pits' highwall slopes will be similar to those in the existing pits and none are designed to be steeper than 52 degrees (Figures 6A – 10).

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Based upon BRI's past experience and its resultant modifications to highwall slope design, the occurrence of larger slope instability problems, such as the rotational slope failures described above, is very unlikely. However, the LMU approach to mine planning and ore production further mitigates the potential for slope instability problems. Because the LMU approach calls for small increases in pit size at each phase of development, should unexpected problems with highwall slope stability occur, they will be correctable during mining operations.

Based upon the designed pit outslopes for the Phase I LMUs, the stability of the existing pit highwalls, BRI's understanding of highwall slope stability management, and the company's mine planning capabilities and experience, BRI believes that the stability of future pits has been demonstrated and the variance from the slope reduction requirement is therefore justified.

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8.3 Reclamation of Water-Impounding Structures

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Because deposits of relatively thick clay underlie the ore bodies, the open pits themselves impound precipitation-derived water. The pits shade the impounded water, reducing evaporation and enabling the water to remain in most pits year-round. For reasons explained above in Section 8.2, the open pits are mechanically stable. The small quantity of water that forms in the bottom of the pits offers no potential for adverse impacts to surface or ground water quality beneath of beyond the limits of the open pits. The pit safety berms, access ramp closures, and signage will provide adequate warning for protection of public safety. The pit impoundments provide water to local wildlife, notably chukkar partridge and antelope. The BLM recognized, in a 1999 Environmental Assessment for a previous revision of BRI's mine plan of operations, the following:

Game species that might occur or migrate through the area include mule deer, pronghorn antelope, and chukar. Chukar and pronghorn antelope take advantage of the impounded water sources in the area (JBR Environmental, 1999a).

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BRI's open pits provide the only impounded water in the area. There are no springs in the mine area. As a result, the pits enhance wildlife habitat in the area and sustain and enhance the proposed post-mining land use.

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A number of existing and future waste rock dumps create or will create impoundments in the natural drainages along the west slope of Spor Mountain. The following text, repeated from Section 6.4.2, describes expected impacts of the waste rock dumps and the impoundments they will create:¶
The proposed mine plan will result in a greater volume of waste rock being stored in overburden piles than was contemplated under the current mine plan. The plan for placement of waste rock in existing drainages will result in partial filling of drainages and resultant reduction in drainage area, since the waste rock is known to be highly permeable and runoff from waste rock piles is known to not typically occur. In addition, the overburden will provide increased capacity for storage of runoff that first accumulates behind waste rock dumps and then infiltrates. Accordingly, the amount of runoff leaving the proposed disturbed areas will be no greater than the volume that currently flows from the area. ¶
¶
The existing canyon-fill waste rock dumps have been stable since they were constructed. Due to the porous nature of the waste rock dumps themselves and the underlying porous alluvial sediments, the waste rock dumps are non-impounding, except for brief periods following major rainfall events, as previously described in Section 4.8.1.

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8.4 Revegetation Ground Cover & Survival

BRI's experience over the last 15 years has shown that the success of revegetation at this desert mine site depends largely on the amount of precipitation and in what seasons it falls during the years immediately following reclamation. The vegetation in some of BRI's most successful test plots succumbed to drought conditions after it had been in place for two or more growing seasons.

BRI intends to develop a soil quality database and use this information, along with the results of past and future reclamation efforts to continue to improve revegetative success. Nevertheless, BRI believes that achieving the revegetation success criteria established by the Division, 70 percent of pre-mining ground cover and survival for three consecutive growing seasons, is unrealistic and inappropriate as standards for vegetative success at this mine.

BRI believes that alternate standards are appropriate for the Topaz Mining Property. Such standards should be based upon BRI's compliance with the reclamation plan and at least minimal reclamation success. The following specific standards are proposed:

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- documentation of the chemical and physical characteristics of soil replaced in each disturbed area and demonstration that the soils are not saline;
- documentation that seed has germinated over the seeded area in two or more growing seasons that need not be consecutive;
- documentation of rainfall quantities over the reclamation period measured by an on-site rain gauge;

- documentation that soil quality has not been adversely affected by salt uptake from underlying waste materials (this may be done either visually, by observing the presence of either vegetation or salt staining, or by chemical analysis).

Then, even if the Division's standards for bond release have not been met, the portion of the reclamation bond for revegetation of the reclaimed area would be released following two growing seasons in which successful germination occurs or three years have passed, whichever is greater after the following conditions are met:

- germination has occurred in two or more seasons, whether or not they are consecutive;
- records show that quality of soil placed on the reclaimed area was adequate and not saline;
- rainfall records demonstrate that two or more successive seasons of exceptionally low rainfall have not occurred over the reclamation period.

Rule R647-4-111-13 states the following:

> Revegetation shall be considered accomplished when:
>
> 13.11. The revegetation has achieved 70 percent of the premining vegetative ground cover. If the premining vegetative ground cover is unknown, the ground cover of an adjacent undisturbed area that is representative of the premining ground cover will be used as a standard. Also, the vegetation has survived three growing seasons following the last seeding, fertilization or irrigation, unless such practices are to continue as part of the postmining land use; **or**
>
> 13.12. **The Division determines that the revegetation work has been satisfactorily completed within practical limits** (emphasis added).

BRI believes that in light of the Division's past experience with BRI's reclamation efforts at the Topaz Mining Property, the foregoing proposal for site-specific reclamation success would provide the information necessary for the Division to make a determination that reclamation had been satisfactorily completed within practical limits as called for in section R647-4-111-13.2. Over 15 years of reclamation experience has established the sensitivity of the vegetative success in the mine area to precipitation and soil salinity. The proposed alternative revegetative success criteria are based upon this site-specific experience, which defines the practical limits of revegetation.

9.0 SURETY

BRI proposes to provide reclamation surety for the reclamation liability that currently remains from past operations and for the disturbances and resultant liabilities anticipated to be incurred during Phase I of LMU development.

9.1 Baseline Reclamation Liability

BRI has carefully mapped existing disturbances using 1976, 1986 and 2001 aerial photographs and topographic mapping to determine the advancement of disturbances and their areal extent. In turn, the disturbances have been classified by disturbance: pits, waste rock dumps and pit backfills, ore stockpiles, and ancillary facilities.

The current status of reclamation at the mine is summarized on the map entitled Disturbed Acres Status of Properties Existing & Released (Plate 12). Five categories are shown on the map:

- pit, dump, ore pad, mine camp and other disturbances subject to reclamation liability;
- pit and dump disturbances varianced in the 1988 revision;
- pit, dump, backfill and other disturbances released or varianced between 1988 and 2000;
- pit disturbances requested for variance in the updated revision;
- reclamation treatment test plots.

The disturbed areas for which there is no further reclamation liability are the following: Taurus pit and dump, Sigma Emma pit and dump, Roadside 1 and 2 pits and associated dumps, the Fluro pit and dump, the former Anaconda pit and dump located in the vicinity of the Monitor deposit, the Monitor dump, the Rainbow pit (part) and dump, the Anaconda pit and dump located adjacent to Rainbow pit, and the Blue Chalk dumps and pit backfills. Table 4.2-1 lists the dates that these pits and dumps were opened and closed. These disturbed areas have either been released from surety requirements after the Division had determined that adequate revegetation success had been achieved or were granted a variance at the time the initial MRP was approved in 1988.

Table 9.1-1 summarizes the disturbed areas having current outstanding reclamation liabilities at the Topaz mine along with their areas (acreages) and proposed disposition.

Table 9.1-1 Current (end 2004) Outstanding Unreclaimed Areas

Disturbance Area Designation	Disturbed Area (acres)	Disposition	Anticipated Timing
Monitor Pit	32.0	Backfill, topsoil, revegetate	Beginning in Phase I
Monitor Ore Pad	13.4	Rip/scarify, topsoil, revegetate	End of Monitor pit life
Dust Suppression water assembly (southwest of Monitor)	1.9	Rip/scarify, revegetate	Post Phase I
Roadside 2 Pit backfill area	5.2	Backfill, topsoil, revegetate	Begins in Phase I
Roadside/Fluro 3 Pit	16.9	Backfill, topsoil, revegetate	Begins in Phase I
Landfill	7.7	Cover, topsoil, revegetate	End of mine life
Mine Camp	8.6	Rip/scarify, revegetate	End of mine life
Laydown area on Fluro dump	4.6	Rip/scarify, topsoil, revegetate	End of mine life
Rainbow Pit 2 borrow, ore pad, ramps	21.6	Backfill, topsoil, revegetate	Post Phase I
Blue Chalk North Pits	23.3	Variance from Rule **R647-4-111.7, 12, & 13** requested	Not scheduled
Blue Chalk South Pit	8.4	Variance from Rule **R647-4-111.7, 12, & 13** requested	Not scheduled
Section 16 North 1 Pit	25.7	Variance from Rule **R647-4-111.7, 12, & 13** requested	Not scheduled
Section 16 North 1 Dump	26.4	Rip/scarify, topsoil, revegetate	Post Phase I
Total Current Disturbed Area	195.7		

As part of this revised MRP, BRI is seeking a variance for reclamation of the Blue Chalk North, Blue Chalk South, and Section 16 North No. 1 open pits. These pits must remain open, as they are today, to allow access to the Blue Chalk North and South and Section 16 ore bodies in the future. These open pits will be expanded in future phases of Topaz mine operations and backfill opportunities will be determined in future phase amendments.

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The surety amounts for the currently disturbed areas subject to reclamation have been calculated using the same methods used for new disturbances to be created in the initial LMUs in the first phase of mining proposed in this plan. In this way the allocation of existing surety, whether for disturbances that are bonded or for formerly proposed developments that have not yet begun, is not relevant. Rather, the existing surety amount would be adjusted as necessary to provide sufficient surety for the currently outstanding reclamation liability as well as the reclamation liability anticipated to be accrued during the development and mining of the Phase I LMUs.

Note: The following subsections will be completed after the reclamation cost estimate for current liabilities and Phase I LMU development is prepared. This will be done after the Division has reviewed and approved the reclamation plans and variances requested in the MRP.

9.2 Methodology

9.3 Facilities Demolition & Disposal

9.4 Regrading & Recontouring

9.5 Ripping

9.6 Drainage Stabilization & Restoration

9.7 Soil Replacement

9.8 Seedbed Preparation

9.9 Revegetation

9.10 Pit Highwall Safety Berms & Fences

9.11 Miscellaneous

9.12 Construction Supervision

9.13 Summary

10.0 REFERENCES

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Appendix 1

Approximation of "Vitro" Royalty Boundaries within the BRI Property - Abbreviated

Appendix 1 Approximation of "Vitro" Royalty Boundaries within the BRI Property - Abbreviated

"Blue Chalk Parcel"	TOTAL ACREAGE
Beginning 432.6', N 83°3' W, from the SE corner of Sec. 9, in T13S, R12W, SLB&M; thence 1191.8', N 63°13' W; thence 633.7', S 26°31' W; thence 666.2', N 89°55' W; thence 932.6', N 26°51' E; thence 593.9', N 63°24' W; thence 349.3', N 26°21' E; thence 607.8', N 63°31' W; thence 1509.8', N 26°46' E; thence 527.0', S 62°21' E; thence 1128.0', N 27°4' E; thence 444.5', N 63°16' W; thence 797.8', N 26°30' E; thence 658.7', S 63°1' E; thence 1241.6', N 19°34' E; thence 345.7', S 70°26' E; thence 181.4', S 0°1' W to the NE corner of Sec. 9, in T13S, R12W, SLB&M; thence 2640.8', S 0°2' E to the E ¼ corner of Sec. 9, in T13S, R12W, SLB&M; thence 1733.3', S 0°3' E; thence 978.6', S 26°38' W to the point of beginning.	221 acres, more or less
"Sigma Emma / Roadside" Parcel	TOTAL ACREAGE
Beginning 984.2', N 61°43' E, from the NE corner of Sec. 8, in T13S, R12W, SLB&M; Thence 642.4', S 34°39' W; thence 1712.8', S 38°6' W; thence 661.7', N 76°2' W; thence 1589.0', S 22°45' W; thence 662.9', N 74°42' W; thence 1572.5', N 22°47' E; thence 651.8', N 75°58' W; thence 937.6', N 34°32' E; thence 1750.9', N 75°55' W; thence 1423.4', N 4°17' E; thence 581.9', 83°27' W; thence 1372.6', N 6°0' E; thence 2170.8', N 5°39' E; thence 1124.6', S 89°59' E to the N¼ corner of Sec. 5, in T13S, R12W, SLB&M; thence 1736.5', S 89°58' E; thence 1343.0', S 4°47' W; thence 571.3', S 75°59' E; thence 1403.7', S 5°51' W; thence 577.8', S 78°0' E; thence 1570.7', S 5°22' W; thence 1066.5', S 76°20' E to the point of beginning.	505 acres, more or less
"Pen / Pan" Parcel	Total Acreage
Beginning at the NW corner of Sec. 31, in T12S, R12W, SLB&M; thence 2525.9', S 89°55' E to the N ¼ corner of Sec. 31, in T12S, R12W, SLB&M; thence 2639.1', S 89°56' E to the NE corner of Section 31, in T12S, R12W, SLB&M; thence 2638.3', S 0°13' E to the E ¼ corner of Sec. 31, in T12S, R12W; thence 412.5', S 1°21' W; thence 1148.4', N 85°7' W; thence 2876.5', S 5°48' W; thence 578.9', N 84°58' W; thence 1265.4', N 5°36'E; thence 786.7', N 85°25' W; thence 2446.2', N 5°3' E; thence 413.2', S 58°44' W; thence 1806', N 28°57' W; thence 1400.7', S 62°51' W; thence 454.1', N 30°16' W; thence 890.2', N 0°8' E to the point of beginning.	314 acres, more or less
"ML Section 32" Parcel	Total Acres
W|SE..., E|SW... of Sec. 32, in T12S, R12W, SLB&M	160 acres, more or less
"ML Section 36" Parcel	Total Acres
All of Sec. 36, in T12S, R13W, SLB&M	640 acres, more or less
Total Area of All Parcels	1,840 acres, more or less

Appendix 2
Mine Class IIIb Landfill Permit by Rule

Appendix 3

Assessment of Potential Impacts to Groundwater Quality from Mining, Ore Stockpiling and Overburden Placement Brush Wellman, Inc. Topaz Beryllium Mine

Appendix 4

Summary of Annual Reports to DOGM

Appendix 5

Memorandum of Understanding with Juab County

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Pit Complex or Ancillary Area	Pit Acres	Dump/Backfill Acres	Other
Rainbow	87.0	384.2	included
Roadside/Fluro	77.678.5	363.1296.8	included
Monitor	62.7	206.2205.4	included
South Wind	82.6	164.6	included
Mine Camp	N/A	N/A	
Camp	35.1	61.8	included
Blue Chalk/Section 16	217.2	420.0	included
Sigma Emma/Taurus	71.7	308.8	included
Mine Roads	N/A	N/A	
Total –	633.9634.8	1908.71841.5	

Note: Ore pad space & access roads included. A perimeter 100 feet wide around the pits and dumps is included. This amounts to a total of 340 included acres

5.2 Mining Methods

The mining methods, beginning with economic analysis and open pit and dump design and concluding with reclamation are very similar to existing operations as described in sections 4.3.3 through 4.3.8 above and are further described as follows:

5.2.1 Economic Analysis

Computer software will calculate the optimum open pit solution for maximum resource recovery on each ore body by means of a modified Lerch-Grossman algorithm. Economic and physical parameters will be periodically customized to best represent each trend. The resultant ultimate pit shells will be the basis for determining economic ore reserves.

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The impoundment features will not be removed from the drainages during reclamation. The ultimate dumps will meet the appropriate hydrologic storage requirements.